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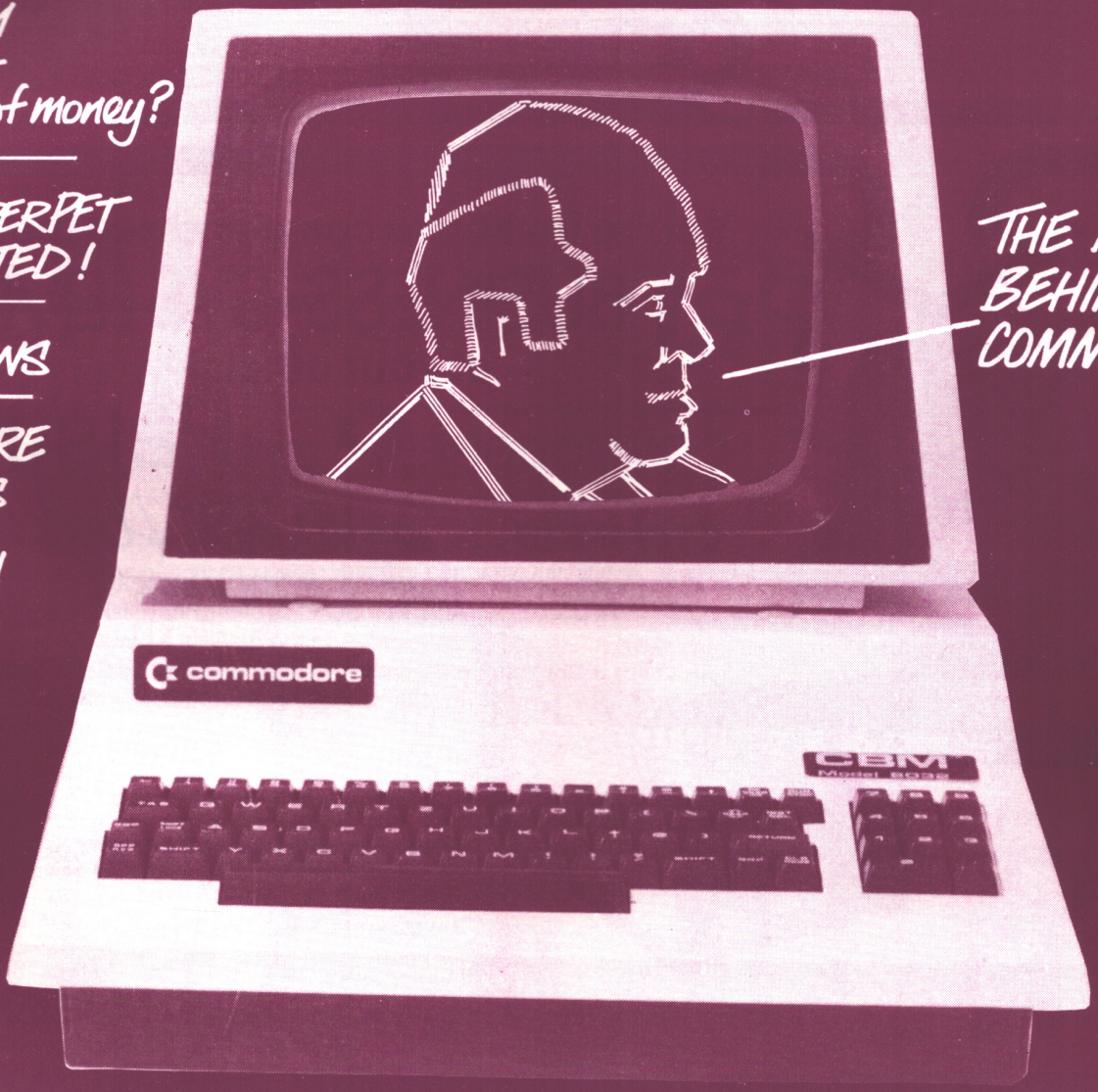

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MP 041 Jumbo Jet Lander, Target Pong, Draw Poker, Galaxy Games — TREASURE TROVE OF GAMES NO:2 £10.00
You are the pilot in this simulation game. Deflect the moving ball to hit the target. Your PET deals the cards – you place your bet and play. Two amazing space battle games.

MP 042 Concurd Lander, Off the wall, Wrap Trap, Spacetrek — TREASURE TROVE OF GAMES NO: 3 £10.00
Guide Concorde to the runway and land – if you can. Try to contain the fast moving ball. Trap the computer in this dynamic graphics game. Startrek game for aspiring Starfleet Commanders.

MP 043 Super 9 x 9, Formula 1, Blackjack, Space Fight — TREASURE TROVE OF GAMES NO: 4 £10.00
Play large scale Noughts & Crosses against your PET. Two versions for old and new rom machines. Grand Prix Game for 1 – 4 players. Choose from 4 different circuits. Gamble without losing money. Galatic duelling for 2 players.

MP 044 Glider, Awari, Othello, Reverse — TREASURE TROVE OF GAMES NO: 5 £10.00
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MP 045 Backgammon, Crypto, Life, Polaris — TREASURE TROVE OF GAMES NO: 6 £10.00
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MP 051 Startrek, Petopoly — TREASURE TROVE OF GAMES NO: 7 £10.00
Rid the galaxy of the evil Klingons. Light years of fun using this advanced Startrek. A sophisticated PET version of the classic board game.

MP 052 Sorcerer's Castle, Jason & the Argonauts — TREASURE TROVE OF GAMES NO: 8 £10.00
A game of fantasy adventure in which you must capture the Sorcerer's treasure and escape intact from his castle. Join the quest for the Golden Fleece

MP 065 Dodge City, Molecules & Atoms, Horse Race, One Arm Bandit — TREASURE TROVE OF GAMES NO: 9 £10.00
You are the sherriff and you must get rid of ten outlaws who are out to get you. Deduce the molecular structure of atoms 'created' by your PET. Up to ten of you can have a flutter on the PET stakes. An excellent simulation of the fruit machine with 'nudge', 'hold' and 'gamble features.

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A self-contained course in Basic for beginners

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A machine code programming simulator

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The ultimate beginners' course in Basic. Includes cassette program and work book ideal for PET newcomers.

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Provides simulations of some standard physics experiments including, helmholtz coils, random decay, shrodinger and momentum.

MP 053 — PHYSICS PACK 2 £10.00
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A series of number games, particularly suitable for 8 – 14 year olds which provide enjoyment and insight into how numbers work.

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This program can be used to illustrate several different parts of a course in elementary probability and statistics.

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MP 033 — BOOKS £12.00
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MP 057 — STOCK MARKET TRENDS £15.00
Analyses movements in the market providing a guide for investment.

MP 021 — PAYROLL £50.00
Two programs; one for 8k and one for 16k and 32k PETs. Processes the payroll of the smaller business.

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Six programs to aid the mathematician in geometry, calculus and algebra.

MP 008 — BASIC STATISTICS 1 £15.00
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MP 030 — BASIC STATISTICS 2 £15.00
Six more tests

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Contains two programs. "The Solution of Differential Equations" and, "The Solution of Nonlinear Equations"

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A Basic program with corresponding algebraic methods to solve linear programming problems.

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6500 Series full disassembler.

MP 004 — MACHINE CODE PACK £10.00
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GD 001 — ASSEMBLER DEVELOPMENT SYSTEM (DISK) £50.00
Aid to programming in machine code or Basic, includess toolkit functions, EXTRAMON AND DOS SUPPORT.

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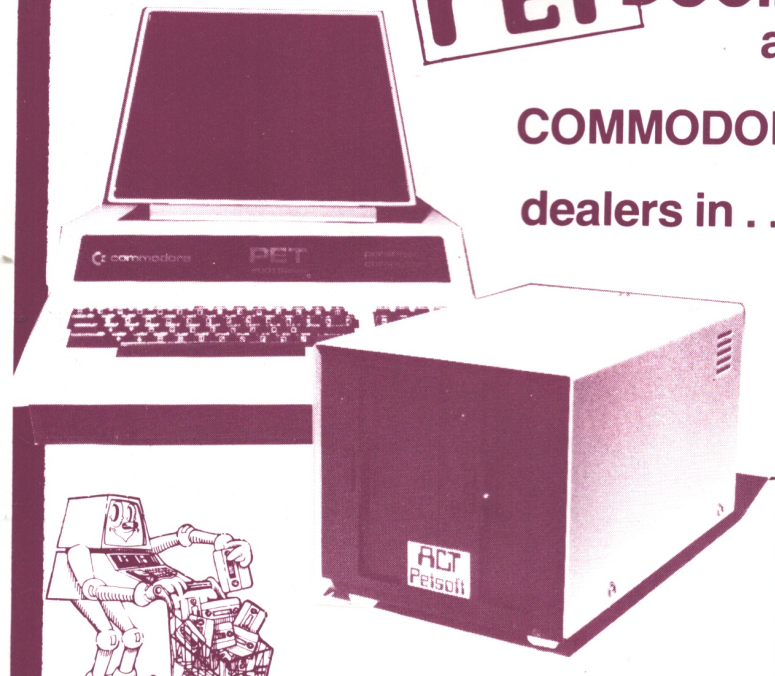

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Due to the exclusive coverage of Commodore's new announcements, Read/Write has been held over until the next issue.

Editorial

It's always enjoyable to be in at the start of something new, and watch it grow, and it's even better to be in at the start of *two* things that grow.

PET has increased in both popularity and specification since it was introduced, and so too has PRINTOUT, still the only regular and totally-professional magazine devoted entirely to PET.

It's therefore with a great deal of regret that I've made one of the harder decisions for me in the last few years — to relinquish the editor's chair, now that PRINTOUT is well and truly established. Pressure of work, especially academic, has been dividing my loyalties, and that's a hard priority to sort out.

But I'm passing my green eyeshade and blue pencil to Terry Hope, a computer veteran with 16 years' journalistic experience. He'll continue expanding the PRINTOUT, with still more news, reviews, programming articles, and all the other things that are increasing our circulation monthly.

And I'm happy to say that my links with PRINTOUT will carry right on, since you'll see my name next month as editorial consultant. This means that I'll have a regular column, and articles from time to time also.

In fact, after my visit to the Hanover Fair, and the exclusive interview I had with Commodore's president, I'm more than ever convinced that PET will stay the number one computer, and will need lots of coverage.

Just as convinced, come to think of it, that PRINTOUT will stay the number one PET magazine, and provide that coverage.

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KINGSTON

KINGSTON — KRK 1

A hardware repeat key for the PET number/cursor pad — a boon to the busy programmer and the ambitious games programme writer. Aided by the detailed instruction programme the average PET owner can upgrade his machine in a couple of minutes without fear of a fatal 'no-no'. **£17.50**

KINGSTON — KRK 2

Initially the KRK 2 was conceived as a definitive full keyboard repeat key. However, Kingston ingenuity has optimized on their patented board accessing techniques to allow two invaluable features to be added:

The first, a warm keyboard reset from otherwise fatal crashes. The second, a selectable keyboard tone which allows touch entry at otherwise impossible speeds. We can say with confidence that this unit is an absolute must for any PET user who wants to get the best from his machine. **£35.00**

KINGSTON — KC 1

A totally new concept in PET's communication with the outside world. At long last the programmer is free from the limitations of the IEEE bus. INPUT, PRINT, LOAD and SAVE to an external RS232 device are now possible without recourse to ingenious/tedious software. A comprehensive on-board firmware package allows all manner of hitherto impossible functions to be achieved including keyboard selectable configuration with full modem control. **£135.00**

KINGSTON — KC 2

Having achieved one level of impossibilities, we knew someone would need more so here it is —

Simultaneous access to two RS232 serial devices or networks with all the features of the KC 1 and more besides. With this device we give PET users serial RS232 I/O capabilities, which the owners of much more expensive machines would envy. **£150.00**

KINGSTON — KSB 1

A twenty-way RS232 multiplexing/switching box with 'mind-blowing' potential — Applications of the unit are legion and range from simple networking through multiple disc sharing to multidevice complexes based on a single processor. **£350.00**

CMC ADA 1200

A low budget IEEE 488/RS232 unidirectional interface, with a proven record of reliability (Field failure rate better than ·1 percent). Since the unit is not addressable it is not recommended for use with the Commodore Disc. **£65.00**

CMC ADA 1400

An addressable IEEE 488/RS232 unidirectional interface, which is proving even more reliable than the ADA 1200 from which it was developed. While it was designed to offer only standard RS232 output it is sufficiently 'beefy' to cope with a number of less demanding current loop applications without modification. **£90.00**

CMC SADI

SADI — The microprocessor based serial and parallel interface for the Commodore PET. SADI allows you to connect your PET to parallel and serial printers, CRT's, modems, acoustic couplers, hard copy terminals and other computers. The serial and parallel ports are independent allowing the PET to communicate with both peripheral devices simultaneously or one at a time. In addition, the RS232 device can communicate with the parallel device. Special features for the PET interface include:

- Conversion to true ASCII both in and out.
- Cursor controls and function characters specially printed.
- Selectable reversal of upper and lower case.
- PET IEEE connector for daisy chaining.
- Addressable — works with other devices.

Special features for the serial interface include:

- Baud rate selectable from 75 to 192000.
- Half a full duplex.
- 32 character buffer.
- X-ON, X-OFF automatically sent.
- Selectable carriage return delay.

Special features for the parallel interface include:

- Data Strobe — either polarity.
- Device ready — either polarity.

Complete with power supply, PET IEEE cable, RS232 connector, parallel port connector and case. **£175.00**

CMC AIM 161

A low budget IEEE 488 16-channel analogue to digital convertor for the competent programmer who wants to 'do his own thing', With a 5·12 volt reference voltage the unit is normally accurate to better than ·5%. **£90.00**

CMC PETSET

An AIM 161 specially configured for plug-in and switch-on use by the less technically graced user. The unit has a number of helpful extras including an input connector board allowing simple screw connection to the outside world. **£135.00**

CMC APPLESET

Similar to the PETSET, saving that the unit is configured for use with the APPLE. **£135.00**

CMC TANDYSET

Similar to the PETSET saving that the unit is configured for the TANDY TRS80. **£135.00**

CMC XPANDR 1

Analogue to digital conversion of up to 128 channels can be achieved by simply connecting as many 16-channel AIM 161 units as you need through this smart board. **£40.00**

TNW Corporation

TNW 2000

With over 2,000 units sold, this IEEE 488/RS232 interface can truly be said to be tried and tested. Features include the conversion of both PET and true ASCII, daisy chaining and full address selection.

Standard RS232. **£135.00**
Current Loop. **£150.00**

TNW 3000

A bi-ported, bi-directional IEEE 488/RS232 interface offering everything the discriminating programmer could ask for. Features include independent crystal controlled Baud rate on both ports and fully implemented RS232 with extensive control line options allowing responsive throttling. **£220.00**

SSM

SSM — A10

Two powerful APPLE interface boards in one:

The first an RS232 serial with three handshaking lines (RTS, CTS and DCD), rotary switch selection of nine standard baud rates from 110 to 19200, including 134·5 for selectrics and the modes of serial communication under software control.

The second a double bi-directional parallel with four additional interrupt and handshaking lines, and interface configuration under software control. **£105.00**

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2. Kingston's guarantee, warrantee and service undertakings are probably the best in the business — If you would like to see what real customer concern is all about, then send for a copy of our standard Guarantee Form!
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If you have an interest in any of these items, give us a call. As you might expect from a company which prides itself in being different, we maintain an engineer on call eighteen hours a day, seven days a week to help you.

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HOTLINE – News & Products

North London Computer Show

The North London Hobby Computer Club has amalgamated with some other London clubs. The result? The Association of London Computer Clubs.

One of their first events is a 'Computer Club Fair'. Worth a visit for anyone within striking distance of London on July 11th and 12th, we'd say.

Venue is the North London Polytechnic theatre, the Poly being opposite Holloway tube station.

Sponsors are ECC Publications; a nice gesture on their part.

On the 11th, 'Educational Computing' are helping to organise a seminar, 'Computers In Education'. On the 12th, the Club's Commercial Users' Group are laying on "experts and users" – (that's an odd suggestion; you can be one or the other, but not both!) – "to answer prospective buyers' questions".

The 12th (which is a Saturday) also features a bazaar of "used or obsolete equipment", which could produce some bargains.

Workpac Computer Systems

Claisse Allen Computing Limited, based in Winchester, have an interesting software product.

It's been specially developed for processing the accounting and administration of companies in the contracting industry.

Easily run on PET, it covers an impressive range: quick and simple wage processing, purchases, sales, cash book transactions, nominal ledger, stock control, estimating, and 'work-in-progress' summaries.

If you have contracting connections, it could be worthwhile having a word with Claisse Allen.

SUPA It Is!

The IPUG break-away group in the South have now come up with their official new name: Southern Users of PETs Association, or SUPA for short. Which you'll have to agree is more euphonious than IPUG.

12 months subscription will cost you £5, and you get in touch with the membership secretary, Howard Pilgrim at 42 Compton Road in Brighton.

Programmable Goodies

Goodies, that is, if your main field is chemical and scientific laboratories.

Dyson Instruments, of Newton Hall, Durham, have developed an external-to-PET programmable relay controller, a programmable analogue to digital converter, and a programmable instrumentation bus interface.

The Dyson design is deliberately external to avoid heat problems, and PET's 5 volt power line isn't used.

On the Move

Q-Com Electronics have moved to new offices in Birmingham's Bull Ring (you'll find them in St Martin's House there). Q-Com supply low and high speed teleprinters, teletypes, visual displays, and similar goodies.

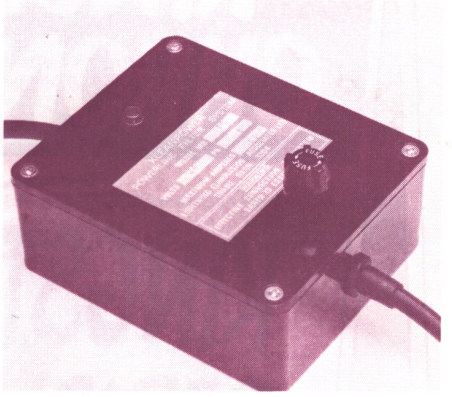
Don't forget the PET Show at London's Cafe Royal, Piccadilly, June 13th and 14th.

'Kleanpower' Is Here!

If you live in an electrically messy area, with large amplitude spikes zipping down your power lines from time to time, Lightning Elimination Associates have produced just the unit for you.

Big 'pro' installations have their specially-cleaned power lines. Why shouldn't you? And now you can. The LEA MB3 Kleanpower unit, priced at around £40, will do the job.

Contact Lightning Elimination Associates at Vine Cottage, Moreton in Oxfordshire.



Litigation Likely

Palo Alto based Nestar Systems are now "pursuing all remedies available . . . under international copyrights and trade agreements" to stop unauthorised sales of pirate copies of their best-selling Toolkit ROM chip.

Copies have apparently been made on both cassette and disk. One Toolkit command no longer works properly in these versions, say Nestar, and the inevitable relocation to RAM can also cause problems.

Rip-off merchants, be warned! And buyers, looking for something cheap, should also beware, come to that.

Fair play note: it may well be tempting to buy, if you're offered software at half the price it should be. Software rip-offs hurt everyone but the ripper, however. No one is going to sweat over producing new software if they know it's only a matter of time before someone steals the only payment they get, and that's their royalties.

Nestar Boss Harry Saal

"If you want what's best for your PET, choose Commodore software."

Kit Spencer
General Manager
of Commodore Systems
360 Euston Road
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The Commodore PET is Britain's best selling micro-computer, with over 18,000 already installed in a wide range of fields, including Education, Business, Science and Industry.

This has led to a tremendous demand for high quality software.

And Commodore has met this demand by producing a first class range of programs, now available from the nation-wide network of Commodore Dealers.

Commodore's support also includes training courses, a Users' Newsletter and Official Approval for compatible products of other manufacturers who reach agreed standards.

COMMODORE PETPACKS

Over 50 Petpacks of programs are available (mainly on cassette) from Commodore Dealers. These cover such popular titles as Strathclyde Tutorial, Statistics pack 1, Assembler Development System, Stock Market Trends and the Treasure Trove Collection of game packs. Plus the new Arcade Supergame Series including "*INVADERS*" – quick to learn but difficult to master and already a No 1 favourite. Prices range from £5-£50.

TRAINING COURSES AND SEMINARS

PET systems are simple to use and any normal advice or assistance you may need can be obtained from Commodore Dealers.

On the other hand, for rapid training on a basic or advanced level, you will certainly be interested in Commodore's intensive 2- and 3-day residential courses. We also run one day general appreciation seminars.

PET USERS' NEWSLETTER

This is Commodore's official method of sharing new information and ideas between the many thousands of PET users. The newsletter is published regularly and for an annual subscription of £10 you can start receiving copies now.

BUSINESS SOFTWARE PROGRAMS ON DISK

Commodore's Floppy Disk Unit and high-speed Printer, combine with PET to form a complete system (ideal for running a business) for under £2,500.

Commodore also produce a range of business software application packages on disk. They were created by leading experts specifically for the PET business system. Here is our current range:–

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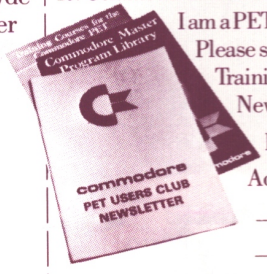

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HOTLINE (continued)

Unique Products from NEB

Bolton-based B+B Computers have announced their official appointment by the National Enterprise Board, no less, to "launch and distribute the unique British computer with Prestel".

Don't misunderstand that last sentence – it's a British computer, and it's got Prestel in it too!

By the time you read this, the new unit will have been officially launched at the Mersey Micro Show (April 30th), and we suspect it will get quite a lot of attention.

Based on the 6800, and made by Technalogics, it's a "self-contained, ready-to-use Teletext/Viewdata decoder and computer unit". It's thus obviously going to be very good indeed in terms of colour graphics capabilities.

It's slated for "education, business and domestic use", and starts at £2,900, complete with two disk drives.

B+B are also announcing 'real' direct access files on Commodore's drives. Labelled BBDOS, the software will accept commands in the same manner and format as CompuThink's drives. That means that most existing software needn't be rewritten for Commodore's disk system, which has got to be good news.

New Catalogue

Described as a 'must', Transam have a new microcomputer catalogue out.

50p to Transam at 12 Chapel Street, London, NW1 5DH, should cause it to arrive shortly afterwards.

It's got details of a whole range of hard-to-get items, such as cables, connectors, boards, sockets and chips, as well as peripherals and software.

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And about time too. Fisher Clark's initiative is welcome!

Only 10 Returns In 10,000!

Remember the old days, when a first-time cassette load was extraordinary? How times have changed. Audiogenics, who do all of Commodore's duplicating, tell us they've produced over 10,000 tapes so far and only 10 have come back.

The Reading-based firm market CBM's tapes direct. Phone orders are OK, so ring them at 0734 595269.

They're also handling a new product, which has already been welcomed across the Atlantic – the system crash recovery device you might have seen mentioned in the US magazines.

Easy to fit, it lets you get out of a crashed condition without losing the program it took you hours to key in. And, as a bonus, it also lets you reset without powering down. At £15.75 it sounds worthwhile.

MOS Acquisition Pays Off Again

CBM's Semiconductor Group is moving into the merchant semiconductor ranks, with its announcement of ten chips it will start offering to industry.

Described as a "full-scale integrated circuit marketing effort", the chips will include three static ROMs, a static RAM, the 6500 microprocessor family, and five interface chips.

Take A Letter

RB Computing have a direct-mail program called (surprise!) 'REMAIL'. But the specification looks fairly powerful, and if mailing's your problem, it might be worthwhile taking a look at it.

Available on CBM disk, it'll cost you £49 plus VAT, but lets you do a whole lot of flexible things in terms of updating, and printing out in various styles and formats.

* * * *

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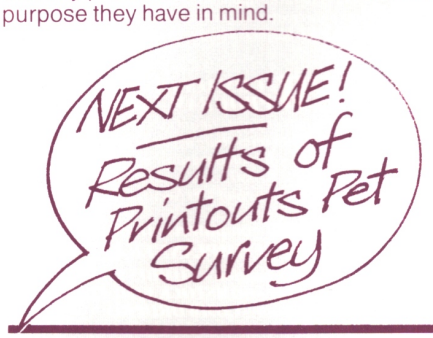

ERROR

In the last issue of PRINTOUT Mr Rennoldson asked us to explain the function of AND, OR and NOT. We went to a great deal of trouble to provide a clear explanation for the benefit of many readers but unfortunately let through one typo that destroys the sense of the article. The upper of two truth tables was labelled as A OR B instead of A AND B. The correct version appears below. We apologise for any confusion caused and hope that you will all understand Boolean algebra now.

C = A AND B
Thus C is 1 if either A AND B are at 1

A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

C = A OR B
Thus C is 1 if both A OR B are at 1

A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

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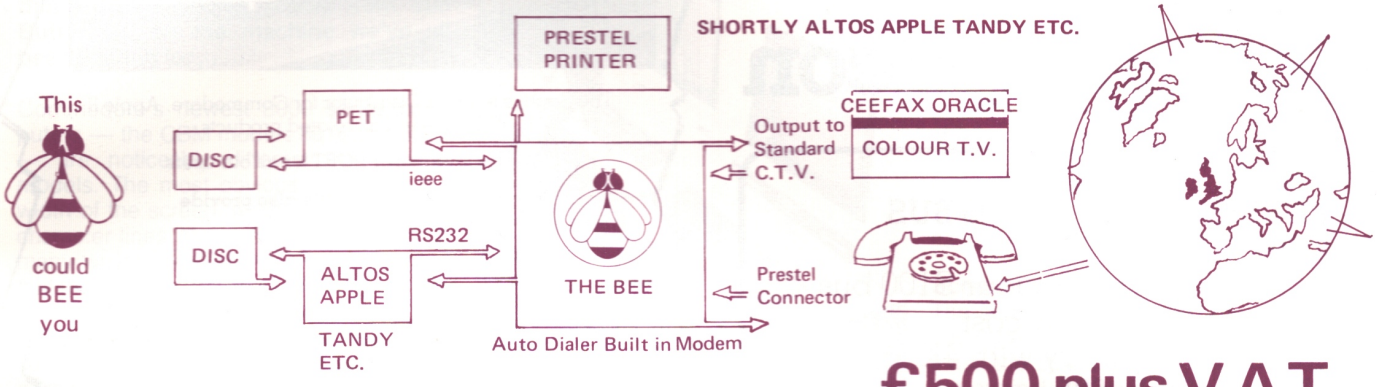

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the CBM JUMBO

In line with PRINTOUT's policy of having the world's best authors and greatest PET authorities, we're happy to feature this world-exclusive report from Jim Butterfield on the machine we've all been waiting for . . .

Commodore's newest 8000 series computers — the CBM models 8016 and 8032 — are noticeably different from earlier models. The most obvious change is the width of the screen, which now allows 80-character lines. Yet it's a gentle upgrade in many ways; users will be relieved to find that there's a great deal of compatibility with previous PET/CBM devices.

Some users will dislike any change, of course. Others would like to see Commodore boldly scrap previous architecture and introduce radical changes. But for most of us, the new design looks like healthy evolution: improvements are being introduced without losing continuity.

Physical Appearance

The screen is bigger, of course, increased to 12 inches across the diagonal as compared to 9 inches on previous models. The computer itself hasn't gained appreciably in size, however. The keyboard housing has been lowered, so the overall height of the 8000 is only about an inch higher than the original PET. The width hasn't changed at all, although the new machine appears less 'tapered' because of the larger screen.

Commodore seem to view the 8000 series as strictly business machines, and all models I have seen are equipped with the business keyboard. This is a standard ASCII keyboard plus a numeric pad. Users with experience on other machines will find it quite standard. Programmers who have been spoiled on PET's graphic keyboard will need some adjustment time: it seems hard, somehow, to have to shift for such popular characters as quotation marks, brackets, asterisk, or the question mark. I find it harder in an instructional environment: you can't reach over a user's shoulder and tap in a correction quite as easily. But the business keyboard is an industry standard, and we might as well get used to it. There are interesting new keys: REPEAT, TAB and ESC (escape), which I'll talk about later.

Edge connectors are unchanged from the previous 16K and 32K models: they are all there.

General appearance and quality is comparable to earlier models. Characters are quite readable on the green screen; resolution is good. Text mode (upper/lower case) is the standard power-on condition, but you can get graphics if you want them. Lower-case characters are identical to earlier models, and descenders on characters like y, g, or p still look a little uncomfortable.

Jim Butterfield puts the machine to the test

Keyboard Features

Cursor movement keys, Insert/Delete, and SPACE automatically repeat if you hold them down. There's an initial pause of a half a second, and then the cursor takes off at a rate of about ten steps per second. The other keys don't repeat unless you hold down the REPEAT key; then they take off right away, with no initial pause. All very handy.

Screen tabulation is built in. Pressing Shift/TAB sets or clears the tab stop wherever the cursor happens to be. After that, pressing TAB takes you to the next tabulation stop in that line; if there isn't one, you'll go to the end of the line. Since Shift/TAB doesn't tell you whether you're setting or clearing the tab, a little care is needed in programming this. Tabulation is very useful for screen tables, but doesn't help for the printer.

The ESC key does a very simple job. It takes you out of the programmed-cursor mode (sometimes called the 'quotes' mode). A minor help for existing activities; but it turns out you'll also need it to invoke some of the clever new screen features that are built into the system.

The RVS key no longer slows down the display when things are printing at a fast clip. This job is now done by the left-arrow key. As usual, the slowdown applies only during screen scrolling.

A new and very handy feature allows screen output to be stopped and then resumed. The colon key freezes the display immediately after a screen scroll. Pressing the left-arrow allows output to continue. This is useful for both freezing program listings and stopping lengthy output runs; it allows the data to be examined before it disappears.

The Bell

The system contains an electronic bell which chimes on power-up, on request, and whenever you near the end of a line. On the models I have seen, there is no speaker or sounding device, but this may be added in final production versions. At any rate, the bell signal can be heard on the CB2 line of the Parallel User Port; a simple amplifier/speaker system will do the trick.

The chiming of the bell interrupts other activities momentarily. If you're repeating characters at high speed on the screen, you'll see a brief pause when you reach the point near end-of-line where the bell sounds. If this is a problem, the chime can easily be shortened or eliminated entirely.

Screen Graphics

The screen still holds 25 lines of text, but each line is 80 characters wide. This would make the characters look tall and skinny if the original screen arangement were kept. Commodore has restored the proportion of the characters by inserting a strip of empty space between each line.

This looks good, but it means that characters cannot touch above and below; and this in turn would cause odd-looking chopped up graphics. A special arrangement is needed to make graphics look good.

When you go to graphics mode, the screen closes up the empty space so that characters can touch. The effect is rather like Cinemascope: the overall height of the display shrinks to less than five inches, while the width remains unchanged at about eight inches. In this mode, graphics from earlier PET/CBM machines look quite good.

This shrinking and expanding of the screen is accomplished with a new type of chip called a 'CRT Controller'. The 8000 delivers a lengthy list of desired screen characteristics to this controller chip, which takes over the job of arranging things on the screen as desired. Although Commodore have only two types of setup for the screen

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— text mode and graphics mode — it looks as if the controller chip could be used in many other ways for special effects.

New Screen Controls

A number of useful screen features are included in the 8000 machines. They promise to add greater convenience and versatility to screen usage.

SCROLL DOWN and SCROLL UP move the entire screen up or down one line. A blank line is left at the top or bottom as appropriate.

INSERT LINE and DELETE LINE are almost self-explanatory. They move the screen from the cursor line, adding a blank line at the appropriate place.

ERASE BEGIN and ERASE END each clear part of a screen line. ERASE BEGIN clears from the beginning of the cursor line up to but not including the cursor position. ERASE END clears from the cursor to the end of line, inclusive; it's a good way to clear a line just before printing on it.

Definable Windows

A dramatic new feature of the 8000 screen is the capability of restricting screen activity to a 'window' area. Once a window is defined, all normal activities are confined within it. Text will go into the window area only; cursor movements will stay within the area; and scrolling, clearing, inserts and deletes will all take effect only within the bounds of the window area.

A window is defined by moving the cursor to the desired upper left location and giving a SET TOP command; then moving the cursor to the desired lower right location and giving a SET BOTTOM command. Only one window may exist at a time; but since they are easy to set up, windows can be switched in and out as desired and the effect of simultaneous windows can be easily achieved.

The window is cleared — or, more precisely, set to the full screen — by giving two HOME commands in succession. This means that a user can always get out of a window with a couple of keystrokes — even if the programmer would rather he couldn't.

The variable window system is nicely done, and careful attention has been given to seeing that all systems interact properly. For example, a user responding to a Basic INPUT statement with a preset window won't have his entered value confused with any adjacent out-of-window data that may be nearby. The bell is even adjusted so that it rings five characters from the end of the window you happen to be in.

Special Programmed Characters

Most users are familiar with existing programmed cursor characters; for example, the reverse-q for cursor down. The new 8000 features have been implemented as additional programmed characters. They appear as reverse field characters within a print string. The new programmed characters can be summarized as follows:

Character	*Lower Case*	*Upper Case*
g	Ring Bell	
i	Tabulate	Set/Clear Tab
n	Set Text Mode	Set Graphics
o	Set Top	Set Bottom
u	Delete Line	Insert Line
v	Erase End	Erase Begin
y	Scroll up	Scroll down

There's a small trick to creating these new reversed characters. Unlike the more familiar programmed cursor characters, these functions don't appear as keys on the keyboard. To create them within a quote-enclosed string, you need to press ESC (which takes you out of programmed cursor mode); then RVS followed by one of the above characters. It works well, but takes a little getting used to.

Software

The current 8000 units are fitted with Basic 4.0. This is the familiar Upgrade ROM with disk operators added to Basic, and with an improved garbage collection routine.

Garbage collection is much faster: a hesitation is visible, but all collections take place within a second or so. The penalty paid by the user for this is a relatively slight one: two more bytes are used for each dynamic string.

The 8000's ROM set is larger. Basic now starts at hexadecimal B000 rather than C000, meaning that users now have an 18K ROM system rather than 14K.

The disk commands are English languge equivalents to the commands already available with the DOS or 'wedge' system. At first glance, they don't seem to do anything new. However, they are much easier to use for newcomers; and they strengthen the PET's excellent human interface. It's a great convenience to be able to press Shift and Run/Stop to get the first program from a disk. Another advantage of these commands is that they can be embedded in a program. We can now write 100 SCRATCH "OLDFILE" and gain ease and simplicity of coding.

The disk commands appear to be written with the new Disk system in mind. This is a new set of ROMs for disk which will enhance its ease of use greatly. No hardware changes are needed: fit the new ROMs, and you have a new disk system. This system doesn't need an explicit Initialize command — it's automatic when a new disk is inserted. There are several attractive features of the new disk system, including an APPEND command and a new style of relative or direct access file; the 8000 commands are geared to support all this.

A brand new disk unit, the 8050, is being introduced by Commodore. Its characteristics are identical to those of the enhanced 2040 unit, except for its huge capacity. With 77 tracks of data and more sectors on each track, a mini-floppy can now hold in excess of two thousand blocks of data. This gives a capacity of over one megabyte of data for the two drives. Many commercial and data storage applications will now fall within the scope of the PET/CBM.

The 8050 dual floppy unit has a similar size and appearance to the well-known 2040. It has a power-on indicator: the centre LED now shines green for power applied, and red for errors. Diskette insertion is slightly different. The high-precision drive mechanism requires precise centering; the simple 'tab' door has been replaced with a more elaborate assembly.

Communications between the PET/CBM and the 8050 unit are the same as for the 2040. Most disk programs will be fully compatible unless they use some of the more esoteric advanced commands. You can't read an 8050 disk on a 2040 unit, or vice versa, but Commodore has developed a utility program which will copy files from one to the other. It's interesting to note that the Commodore program seems to be able to change the 8050 device number on the IEEE bus via software.

Compatibility between the two styles of 2040 system — the original and the upgrade — exists in part. Each type of unit can read the other's data, but cannot write to a disk that was new-ed on the other machine. A quick COPY will fix up any problems in this area, but the user should keep in mind that there are six less blocks available on the new style of 2040.

Machine Language Considerations

The various subroutines in Basic ROM have moved around, of course: that's unavoidable. Machine language programmers will be happy to know that the vital zero page locations are virtually unchanged. Adapting existing programs shouldn't be too hard.

The second cassette buffer is now used in two ways. The lower addresses are used for the disk commands; and higher addresses (hex 03EE and up) are used for tabulating TAB positions. Greater care will need to be exercised in using the buffer for staging small machine language jobs.

The Machine Language Monitor is unchanged. It can still be extended with extra commands; and 'uncrashing' is accomplished in the same manner as for previous models.

Some of page zero has been released. Since screen lines no longer need to be linked together into 'double' lines, the fairly lengthy screen-wrap table isn't needed.

Serious programmers will be delighted to find that special vectors are provided for input and output. Now they will be able to link their own I/O routines directly into the system.

Summary

It's still distinctively a PET/CBM style machine. It retains its friendly personality, and the new features look good.

The 80 character line screen will make many new applications possible — especially those involving columns of figures. Basic hasn't changed at all, and most changes are gentle, so as not to obsolete old machines or programs — or old programmers, for that matter.

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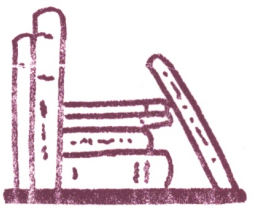

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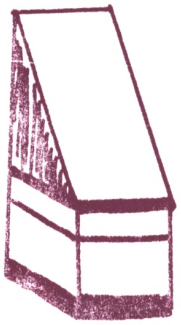

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BOOK REVIEW

32 Basic Programs For Your PET

This book, published by Dilithium Press, and written jointly by Tom Rugg and Phil Feldman, contains exactly what the title says. In that, therefore, there's no chance of the publishers or authors falling foul of the Trades Descriptions Act.

The only thing that's likely to happen is insufficient numbers of the book being sold, because the title doesn't say enough about what's in between the covers.

Mind you, the book isn't cheap. Imported by LP Enterprises, and available from them, your local computer store, and doubtless the better bookshops too, it'll cost you £10.10 per copy.

So is it worth it?

In the opinion of this reviewer, the answer must be 'yes' for many categories of PET user, but 'no' for some. Let's clear up the latter right away: people who are already into machine language programming may find the book mildly interesting, but that's about all.

If, on the other hand, PET is your first computer, and you've only had it for around a year or less, then *32 Basic Programs* is quite likely to be right up your alley.

What's in it?

Apart (obviously) from the 32 programs, quite a lot of extras, all connected with each of the programs. The thought which has been put into the layout and approach of the book is clearly considerable.

Each program is first described, in terms of what it will do, with especial reference to what the various program blocks are doing (the instructional element is therefore high). Then come pictures of what you can expect to see at various stages on PET's screen. These are followed by the full program listing (very clearly printed, too), and then come sections on experimental changes you can make, and suggestions for extensions of the program in other directions.

The programs themselves are grouped into utility programs for the home (I especially liked the one which helps you reach a decision on which course of action to take, when confronted with several possibilities); games (nothing too far out — in fact, many are familiar to hardened PET users); graphics programs (there's some good stuff there); mathematical programs (again fairly familiar to the older hands, but excellent for new users); and so on.

The writing style is lucid, friendly, and often humorous, and quite obviously also, the authors know their subject well, which makes for a great deal of confidence for the novice user.

In short, *32 Basic Programs For Your PET* is thoroughly recommended for all new PET users, quite a few of the increasingly-experienced, but will be fairly familiar ground for those who have been 'hacking' for some time. (Though maybe everyone should remember that each program comes out at only about 31 pence.)

Don't expect ultra-sophisticated routines, dripping with PEEKs and POKEs (in fact those we found were only for the screen), but do expect a well-written and well-designed book which, even if it doesn't contain much for you, may well start others in your family off on the computer trail.

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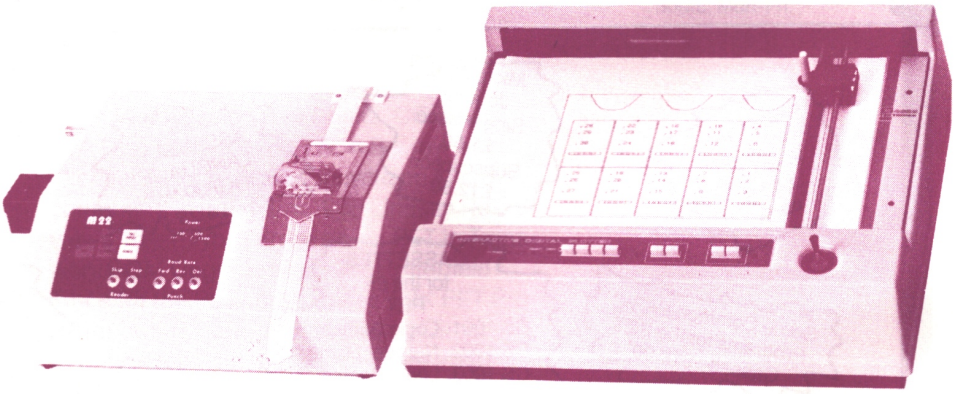

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PETS & PIECES

by GAVIN SANDERS

Farewell and Hail!

I'd like to start off this month by saying goodbye (and if Ron Geere cheers I'll bust his bicycle clips).

Seriously, it's a slightly sad moment for us here at PRINTOUT, as you'll have seen if you worked your way through the magazine, instead of dashing straight to my page as usual!

We're losing our editor, Richard Pawson. Right at the beginning, before Issue 1 struggled forth, Richard stood by, rubber gloves on, hot water to hand, ready to drag us kicking and screaming into the world. Quite touching it was, all that dedication.

And he's been here ever since, nursing a bit here, tending a bit there, as we've grown.

But now he has to move on to other things, and we're sorry to see him go. But he's not leaving us totally, I'm glad to say; his name stays on the page 3 mast-head as technical editor and his by-line will be a regular feature in the issues ahead.

The new boy in the editor's chair is Terry Hope, who takes over from the next issue. I know him well, and we all wish him as much luck and success as we wish Richard. Which is one heck of a lot.

Weightwatchers, Ahoy!

When your last copy of PRINTOUT arrived, did you feel the immediate difference? The greater thickness and weight?

And did you notice it with this one too?

Several people have said that it's funny how quickly you subconsciously get used to something, and then notice a difference when it happens.

PRINTOUT, like all beginning magazines, was really quite slim when it began, but now the growth exercise is on with a vengeance.

Every issue adds four pages to the total, which means that by the end of the year, we'll be getting very close to the 60-page mark, if not actually past it.

That'll mean, um, let's see . . . 600 pages, all about PET, every year!

More, in fact, for PRINTOUT has no plans to stop at 60 pages. The whole PET scene is exploding so frenetically that it's as much as we can do to keep up with it all.

And where else, I ask myself (and you too, come to that) can you get a 600+ page book, solely and exclusively about PET, often containing information or news you couldn't or wouldn't get anywhere else, for £9.50, the cost of a year's PRINTOUT.

If you've browsed along any computer bookshelves recently, you'll know that the slimmest of volumes costs the most extraordinary price.

And even a subscription to a PET-users group or club (and I'm not knocking them, believe me — long may they live and flourish, especially the independent ones) usually costs more for a year than we do. And with some, you only *hope* you'll get a magazine from time to time.

Sorry then, but if we sez it ourselves, every succeeding PRINTOUT, with more pages, more pictures, and more PET, gets better and better value for money.

End of commercial.

Spot the Errors

If you sit gloomily over breakfast most days, reading the cornflakes packet for the nth time, trying to get used to the horror of a new day, you'll be familiar with those 'Spot The Difference' competitions.

You know the sort of thing — two pictures, one subtly altered from the other, and you have to see where. Find all the changes, and you're off to the Barbados, or Butlins, or somewhere exotic.

Well, I have a variation for you. It might help to while away some otherwise boring periods.

There's just one problem: you can only take part if you're in a Commodore dealer's shop. But doubtless you *do* find yourself in such places from time to time, so here's what you do while waiting for someone to see you're there.

Which can sometimes (have you noticed) take quite a while.

Look around and you'll probably spot a computer listing stuck up on a wall. Closer inspection will show that it's a *Commodore* printer listing (what else?).

At first sight, it's a model of crispness, all crackling with the Commodore's well-known snappy approach to life. Little letters, big letters, reverse letters, stretched letters, bar charts, tabulations, graphics — it's got the lot.

It certainly shows off the Commodore printer to perfection. What a shame it doesn't do quite the same for the Commodore's educational standards.

So here's your challenge, should you choose to accept it: see how many spelling errors you can find. The best effort so far goes into double figures, but our man was mistakenly disturbed by a sales-person, who didn't realise he was a customer.

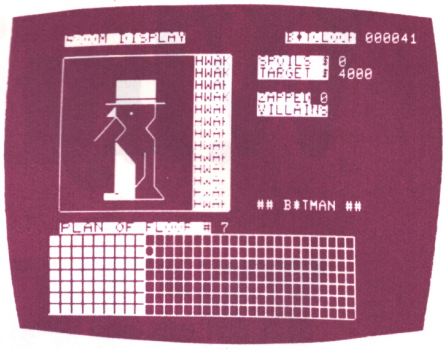
Great Panting PETs, it's the Dynamic Duo!

It's sort of getting to be a habit in each issue, for me to comment on one or other of the pieces of software that cross my desk every month.

I make no apology for that; quite a few of you have been kind enough to say that as long as I stay objective, the Sander's Mini-Review is often quite helpful.

It apparently lets you home in on some of the really good software around, which simple 'once-bitten-twice-shy' reactions might have had you hesitating over otherwise.

So this month, let me unreservedly recommend 'B*TMAN', one of the new offerings in the Spring Petsoft catalogue.



Not, mind you, that you'll find it to be the world's most *intelligent* computer game but, with my hand on my heart, if you want to see PET's graphics used to their near-ultimate capacity, you can't afford to miss 'B*TMAN'.

Get it. You won't be disappointed, and your kids will *love* it. At least on Level 1, they will. I doubt that even the fastest-fingered player in the West will beat it on Level 3.

Testimonial Tail-Piece

I've been a mite waspish this month about dealers, among other things (and I'll carry right on being critical about anything that deserves it), but let me finish with credit where credit's due.

Petalect are a dealer in the South, and I was in their Woking shop the other week.

I've no doubt there are super dealers all over the place (and if you have good — or bad — experiences, write and tell me; I'll pass your comments on right here in Pets and Pieces).

But here's a comment on Petalect, for those of you in the South who'd like an opinion. First impression: very good hardware stocks (you're unlikely to find them out of anything), and very good software stocks too; nearly all the Petsoft range, and just about everything available from Commodore.

And the latter includes Commodore's range of 'Arcade' games which only days before a large London dealer, in Tottenham Court Road, had disinterestedly told me "weren't available from Commodore yet — I *think* we'll have them when they are."

Petalect people? I met Deryk Randall, their technical manager, and very helpful he was too. Perhaps most impressive was his reaction when a nice young lady walked in. She was from an existing customer with a small software problem, so Deryk straight away (a) organised a coffee for the lady and me and (b) sat right down and reprogrammed her software problem out of existence.

It was an impressive performance, and I'm happy to pass it on here.

Let me say it again: write and tell me about *your* dealer experiences, good, bad, or plain grey mediocre. I'll print what's printable, and who knows, we might even be able to sort some problems out.

See you next month. Happy hacking!

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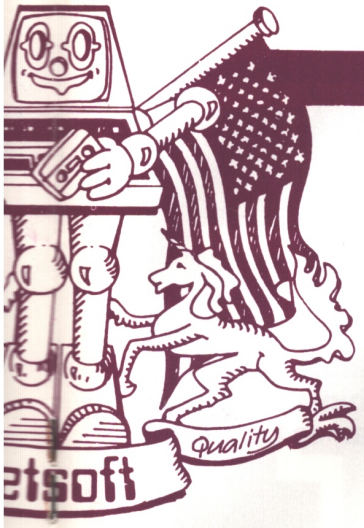

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Who Do You Want To Be?

screen pictures by Richard Charman

Fantasy games have arrived for your PET — provided you have 16K or 32K available for most of them. Terry Hope has spent an interesting period, being almost everyone but himself. Emerging haggard, and savaged by unspeakable monsters, he reports here on the games he played, and whether they're worth what you'll pay for them.

M and S are two letters that have a special meaning for *afficionados* of inexpensive clothing and nice groceries at reasonable prices.

In the same way, H and C have a special meaning for readers of *Dalton's Weekly* and pursuers of decent B and B (yet *another* two-letter abbreviation).

You may not know it yet, but D and D have a highly emotional meaning also for certain enthusiastic people.

Who are they? They're the Dungeons and Dragons addicts of this world. And just in case a small smile steals across your lips, let me say now that I felt the same way, until a month ago.

That's when my review copies of 'Starfleet Orion', 'Invasion Orion', 'Datestones Of Ryn', 'Morloc's Tower' and 'Temple Of Apshai' arrived.

Since then, I've acquired ample reason to change my mind a bit!

First, some background. The games I've mentioned (by no means every fantasy game available, but many argue they're the best) are all from Automated Simulations.

Automated Simulations are a small but highly enthusiastic group, headed by two delightful gentlemen.

On my left, James W. Connelly, short, studious, looking exactly like the kind of chap you'd engage to represent you in any sort of legal affair.

On my right — hold tight — Vaso Medigovich, immensely tall, possessed of a certain Transylvanian harm, and looking exactly as if he'd just stepped out of one of their own games.

Behind James (who's credited in the game manuals with being the primary programmer) and Vaso are yet more people.

They design the games; write the rules of play; test the games out; provide chilling descriptions of places you, the hapless player, find yourself in while playing; and write the bulky books that go with each package.

And about the latter, a great deal more in a moment.

So what about the games themselves? Well, for space reasons (and that's not a joke!), I won't say much about the two space games 'Starfleet Orion' and 'Invasion Orion'.

There are two reasons: one is the genuine fact of space limitations (I could easily fill four or five pages); the other is quite simply that they're not in the same category.

Note that I say 'category' and not 'class'; the two 'Orion' games are good, but in no way resemble the three fantasy games.

Both the 'Orion' games were put together in 1978, with 'Starship' coming first, followed soon afterwards by 'Invasion'. They weren't widely promoted, but attracted an enthusiastic, if esoteric, following nevertheless.

Looking at them now, in terms of what you see on PET's screen, has a sort of curious nostalgia when they're compared with 'Datestones', 'Morloc' and 'Apshai'. But you'll enjoy them, especially if you're into space things.

Let's look now at the three total fantasy games; games that take you into a world populated by extraordinary monsters; fusty caverns and rooms; glittering treasures and, of course, you.

'Datestones Of Ryn' is described as Microquest Number 1 by the designers, and you can play it on a 16K PET, the only one that does fit into the smaller 16K memory.

What you get for your money is a cassette containing the game itself on one side, and a data file for reading into the game on the other. You also get a 16-page book, with a well-designed and coloured cover adding another 4 pages.

All this costs just £9, which is very good indeed when you remember some software costing more.

The 'Datestones' scenario casts you as Brian Hammerhand, "presently least senior officer of the cavalry troop, and drawer of the shortest straw", as the instruction manual says.

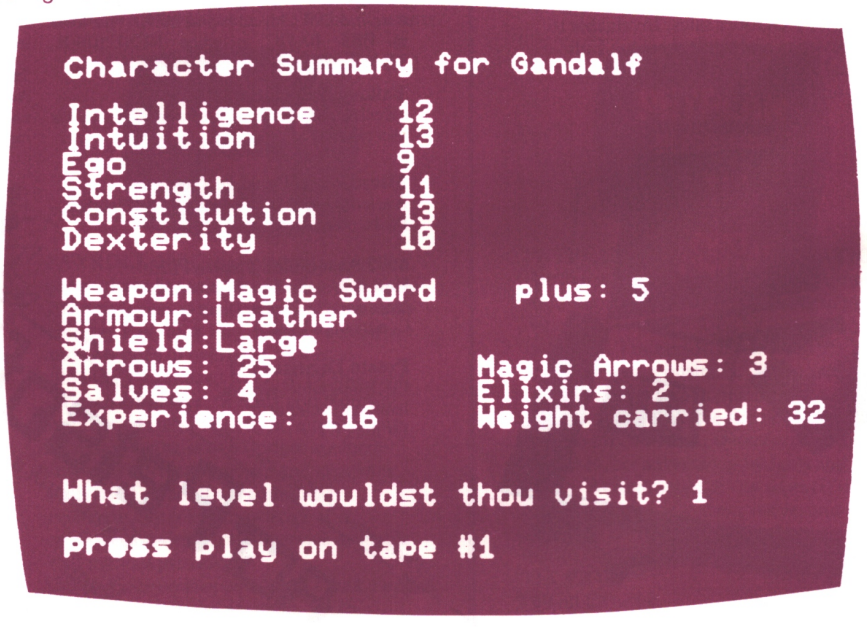
Because you drew the shortest straw, the rest of the troop is expecting you to go into the caverns just outside the Duchy of Ryn, wherein the dastardly robbers are hiding, along with sundry rather nasty monsters.

Your cavalry troop is chasing the robbers because the latter have just nicked Ryn's datestones: "the duchy's most revered possessions, and the foundation of the ducal calendar". Is it any wonder you have to get them back?

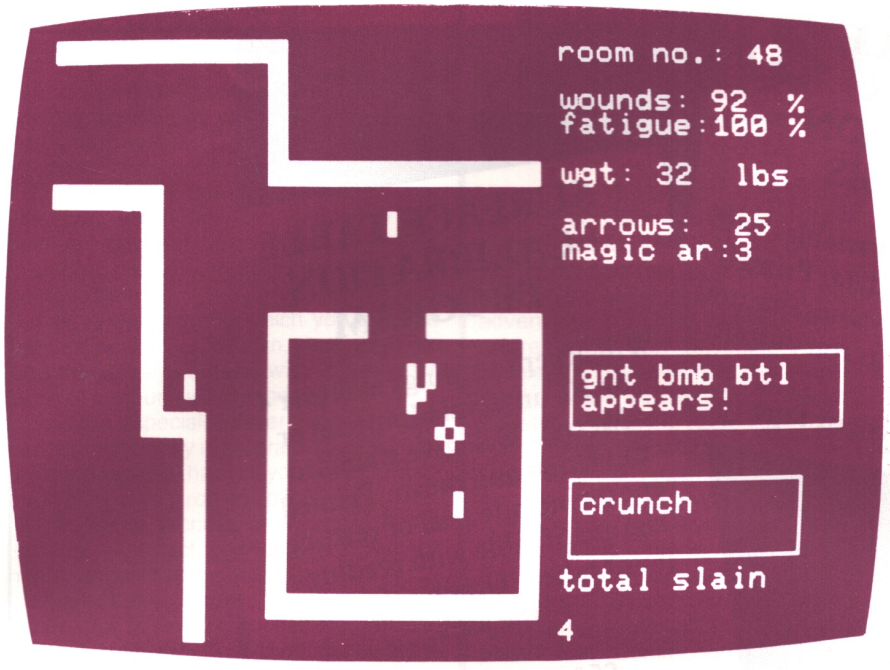
From the computer's point of view, PET acts as your 'dungeon master' — a phrase that'll be familiar to D and D people. In fantasy games played on a board, the 'dungeon master' is a neutral, non-playing referee, who makes decisions about play at frequent intervals.

Thus the 'Datestones' program sets PET up to do this, with the additional data file on tape providing the key information about the caverns, monsters, robbers, datestone whereabouts, and so on.

At the game's start, you are given points against six personal attributes: Strength, Constitution, Dexterity, Intelligence, Intuition and Ego. These govern how well



Inside the Temple of Apshai, attacked by monsters



Every room in the Temple is different

you're going to do when you go (gulp!) into the dark caves, and find yourself up against the 'baddies' inside.

Note that the attributes points you get are always the same. This is something I'll be coming back to when we reach 'Apshai' in a little while.

Identical also, from game to game, are the other bits and pieces you're given, like the type of armour you're wearing; the sort of sword you have; the size of shield; the number of arrows (both ordinary and magic) for your bow; and the number of healing elixirs you carry (for drinking if you get badly bopped by a brigand, or chomped by a monster).

Thus equipped, character-wise and weapon-wise, you're ready to enter the caves to find the datestones. At this point, PET draws very well-designed maps for you, and watching this happen is an entertainment in itself.

Also on-screen is a set of information showing how tired you are; how wounded you are; what you're being attacked by (if anything); how many datestones you've collected; and, most important of all, how much time you've got left.

For not only do you have all those things to contend with in the caves — you also have a time limit — a rigorous 20 minutes.

In that time, you not only have to slay as many monsters and 'baddies' as you can; you must also find and bring out as many datestones as possible. You get bonus points at the end for the monsters you slew, the stones you found and brought out, for being out yourself, and for simply being alive. And that last ain't easy, young Brian Hammerhand!

Throughout all these goings-on, you have a whole series of special commands to move yourself around; battle with the 'baddies'; grab up datestones; search for, and open, secret doors; check on the existence of cunningly concealed traps; talk to monsters (they do sometimes talk back); and drink your healing potions, should the need arise (and it seems to quite quickly!).

That then is 'Datestones Of Ryn', and it makes the most complicated game you ever played on your PET so far look like a picnic!

I've described it at some length, because many of the features in 'Morloc' and 'Apshai' occur first in 'Datestones'.

In fact, 'Datestones Of Ryn' is said to be an introductory game to the 'Dunjonquest' (their spelling, not mine) series but there's some confusion over whether it's the second or first game.

The back of the manual says it's the second (as the 'Morloc' manual says 'Morloc' is the third), but no one I've spoken to knows of another, preceding 'Datestones'.

Which brings us to 'Morloc's Tower'. And I'm very much afraid that you 16K people will have to read on from an academic point of view only, for 'Morloc' needs around 20K, which means 32K for most.

The major reason for the greater space is the expanded number of things you can do in the game (more of that in a moment). That, and the fact that you can play it on three levels of difficulty!

The scenario this time still has you as Brian Hammerhand, but your opponent has changed. For the worse, I might say!

It's now crafty old Morloc, an unpleasant man much given to hurling fireballs at the village of Hagedorn, lying close by his tower.

Your mission is to enter the tower, find Morloc, and do him over. And if you felt 'Datestones' was hard, you haven't lived till you've had a go at Morloc the Mad!

As in 'Datestones', your character attributes are predetermined, and similar for each game. But there the familiarity stops. You have more commands to use; more treasure to find; more dangers coming at you from every point of the compass; and much, much more of a challenge.

You have 30 rooms to explore, on various floors of the tower, and each one is again drawn graphically on-screen by PET.

In any of them (and it often seems like all of them), really unpleasant things lie in store for you.

Many will bring your quest to a sudden and abrupt end, just when you thought you were doing well.

'Morloc' is a mind-stretcher of a game, and for what it comprises, very low-priced indeed (as in 'Datestones', just £9 for everything: game cassette and data files, plus 16-page manual).

But even 'Morloc' pales into insignificance when the incredible 'Temple Of Apshai' comes on the screen.

'Temple Of Apshai' is a clear and logical development of 'Datestones' and 'Morloc'; it was inevitable, given Automated Simulations' creation of the first two, that they would bring something like 'Apshai' into being.

Sorry, but once more 'Apshai' requires 32K to hold it, and this time there's very little space left — 'Apshai' is a very, very long program.

In fact, it takes over 7 minutes to load from cassette, and that doesn't include the data files. They can add another 5 minutes or so before you're in game-playing mode.

It has dozens and dozens of random calls, and nearly 700 multi-statement program lines. It leaves barely enough bytes from your available RAM to play the game, and it's little short of monumental in scope.

At this stage, I think I might well quote with good reason from the 60-page (yes, 60-page!) manual that comes with 'Apshai':

". . . have you ever wished you could cross swords, just for fun, with Cyrano or d'Artagnan, or stand by their sides in the chill light of dawn, awaiting the arrival of the Cardinal's guard? Ever wondered how you'd have done against the Gorgon, the Hydra, the bane of Heorot Hall, or the bull that walks like a man? Would you have sailed with Sinbad, or Captain Blood; sought passage on the ship of Ishtar, or drunk of the Well at World's End . . . if any or all of your answers are 'yes', you're a player of role-playing games, or you ought to be . . ."

Now though this introduction, or something quite similar appears in both 'Datestones' and 'Morloc', there is one key difference between those two and 'Apshai'.

This is that 'Apshai' is labelled by its creators as a full-scale Epic Adventure (their capitals, not mine, but justifiable), rather than a Microquest.

The first difference you find when beginning play (apart from the time it takes to load the damn thing!) is that you have a choice in terms of your character.

You are initially confronted by an Innkeeper (a person you will grow to dislike intensely as you play on!) who offers you the option of choosing your own character, or letting him give you one.

The novitiate will probably let the Innkeeper work out an initial character (a reasonable move), and the first of the random calls then come into play, because the six familiar attributes of Strength, Constitution, Dexterity and so on are chosen at random, not unalterably preset.

On the other hand, you can choose them for yourself, and this is just what you do when you come back to the game subsequently. For when you finish one game, you note the values with which you emerged, and key them in when you play again.

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WHO DO YOU WANT TO BE? (continued)

And these personal values change, according to how well you do in the Temple. You'll find yourself getting smarter and stronger, for instance, the more you play.

If you let the Inn-keeper choose your character, you'll then find yourself in bargaining mode with the good man, as he tries to sell you the various bits and pieces you're going to need.

This is the stage at which you discover he's a singularly crafty man, since (I kid you not) he actively bargains with you over the price of armour, swords and the like.

And the especially clever thing is that his bargaining ferocity is program-controlled by the attributes you have! If you haven't much Intelligence, he'll rob you blind!

This whole process is enjoyable in the extreme — in fact, you're likely to feel it's nearly as good as the main game!

Nearly, but not quite!

For after buying as much as you're able, with the money PET doled out to you at the start of the bargaining session, you have only one option — to enter the Temple.

You make a simple decision — Level 1, 2, 3 or 4. But on that hangs a multitude of messy monsters, diabolical deaths, and terrifying trips.

It's hard to describe how much the game can grip you; at times, it's almost like being in the mythical Temple (though agreed it's cost you £19* — the cost of the game and all the accessories — for admission).

Though the manual runs to 60 pages, that doesn't mean the game is complicated. Simply that it's vast in scope.

I actually found it a great deal more easy to learn than 'Star Trek', and one heck of a lot more enjoyable (though you've no idea how hard it is for me to utter that treason; I was a Trek freak too, in the early days!).

Final verdict then: are the games worth the money?

The answer, for me at least, has to be a resounding "yes". I know the arguments about using a computer to play games.

In this case, I can only respond by saying that not one of these games would be possible without the computer, or a very great deal of time and effort by others besides yourself.

And that surely must be the test? Is the game you're playing simply 'mechanised' by your computer? Or is it genuinely dependent on the computer for its existence in the first place?

'Datestones', 'Morloc' and 'Apshai' are products of the machine they're running on. They won't disappoint you.

* From Petsoft and most PET dealers.

Kit 'Knuckledusters' Spencer

PEEKS & POKES

by Inside Trader

Lots of correspondence this month: Dr. Osborne writes from Berkeley (pronounced like berk, poor souls) in California to say how much he enjoyed reading about the adventures of Tiddles, but asks whether my reference to Burt Reynolds implies that Desperate Dave wears a wig. I reply "Yes, but *not where you think*" . . . . . A Mr. Colin 'Cheeky' Stanley of Kettering is apparently considering reporting me to the Press Council. The last meeting I attended (held in the Star Chamber Bar of the Fleet Street Arms) ended with the complainant, a Mr. Green, being sentenced to buy a round for the assembled hacks. Colin won't like that . . . . .Mrs. C. Sinclair wants to know if I make the column up myself. Specifically she complains that Commodore have not only declined to sell her tickets for their panto but have denied all knowledge of it. This will come as no surprise to anyone with experience of the Commodore switchboard. However, if Mrs. Sinclair will telephone Slough 74111 and ask for Mr. Keith Hall, she will — eventually — be put through to the ticket office. Furthermore, Mr. Hall has a large *magic wand* on his desk . . . . . To the Berkshire Castle of Julian Allason to warn him about the dangers of overeating. However, I am met by a Michelin style figure 'jogging' across country. In the interests of preserving what remains of our wildlife, I return home quietly . . . . . Opinion in the shop is divided as to the authenticity of a customer's letter suggesting we ask PRINTOUT to do a *'Day in the Life of Kit Spencer'*. I notice that it is postmarked 'Slough'. On the off-chance that the suggestion is not merely mischievous, I telephone Kit. There is a long silence, the sound of a knuckle duster being dropped, followed by a voice (aside) saying "Get Goltz in here". Tactfully I ring off . . . . . Further enquiries about my identity, this time from the 'Cultural Attache' of the Soviet Embassy, following my exclusive story about the Russian *Commissar RET* Computer. May they send some of their 'boys' round for further details? . . . . . Having outfaced the Commodore S.W.A.T. Squad I am not to be intimidated by these hoodlums. But what if they are indeed 'Cultural' attaches? Unlikely, but the thought of a load of intellectuals and ballet dancers *defecting all over my office* is enough to bring the correspondence to a close . . . . . Robin Bradbeer is cross with me for revealing his role in the Commodore Panto. May I therefore appeal to people to refrain from calling him *'Buttons'* . . . . . The Curse of the Commodore has struck down another victim. This time it is Charterhouse, the merchant bank who backed the original Byte Shop chain that went bust last year, allegedly owing Commodore and smaller suppliers, thousands. Charterhouse's efforts to secure the lucrative Southern Television franchise have been hampered by a series of mysterious happenings culminating, according to the *Sunday Times*, in the computer on which they were working out final details of their bid, *blowing a fuse* . . . . . The staff at Analogue Electronics have asked me to cheer up Graham Heggie with a mention. But surely it was *Miss Piggy* who complained that 'Peeks & Pokes' was "a self-serving mutual admiration society that wrote about all the wrong people"? . . . . . As I predicted last month, solicitors letters and writs are flying about like confetti. 'Irsute 'Enery Budgett 'as 'ad one, and so has Desperate Dave. Guy Kewney is used to it: "I just promise never to write about them in *Computing* again", he says. "It always works" . . . . . My *Fort Worth Fink* tells me that Tandy now tacitly admit that their BASIC is inferior and have gone, Stetson in hand, to Microsoft for "a nice BASIC like the PET has". So maybe the new colour TRS-81 will be compatible after all . . . . . Customers keep asking me about the new 8050 disk. Commodore are being customarily tight-lipped but I can reveal that the drives have a density of 96 tracks — as opposed to 35 on the 3040. So are they fully compatible? Answer: No, but it should be possible for the new drive to read 'old' diskettes by skipping tracks under software control. My friends at Micropolis tell me the Commodore is paying them nearly *£200 a drive* . . . . . Love at first byte: Richard Pawson has developed an amazing new technique for romancing non-English speaking computer birds. Visitors to the Hanover Fair witnessed the *legless Lothario* chatting up astonished frauleins in BASIC . . . . . Don't buy one of those new fangled TV projectors yet. Whilst in Japan last month those *Naughty Nips* at Sony showed me their new wide screen video projection system. It is meant for the TV, but I rather fancy ten-foot wide Startrek . . . . . Stopping off for a quick pint at the exclusive Burnham Beeches hotel, I am amazed to see my suntanned friend Chris Fish, Commodore's International paymaster-general sneaking in the back way with a coat over his head. Next comes Bob 'Marbles' Gleddow, Grand Vizier of U.K. Consumer division, with collar turned up and trilby pulled down, followed by Kit Spencer in an enormous pair of Mafia-style sunglasses. Worse is to follow. Old Mother Peddles bar and snug has been specially converted into a high-security wing for the occasion, and is guarded by a sheepish looking Nick Green clad in a *Gestapo-surplus* leather coat. What can this mean? . . . . . World's Most Expensive Trestle Table: this month's Cheeky Chappie award goes to the delectable Ilona Uhl for managing to keep a straight face whilst charging punters £500 for a trestle table at the PET Show . . . . . Are all these big screen SuperPETs making you feel inferior and depressed? Fear not; soon you, too, can enjoy the Big Screen Scene with a new add-on 80-column monitor. Simply whip off the existing housing, switch video chips, replace with a brand new 'wide screen', and Chucks your uncle. Coming soon at a PET

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INSIDE TRADER (continued)

dealer near you . . . . . I am surprised to see one of the weekly computing papers devote space to praising one of the newest micro distributors. This gentleman has a remarkable track record in other businesses he has managed — usually for a very short time . . . . . My undercover man in Cupertino reveals that Apple have now abandoned plans to develop their own processor. The super-secret new Apple III uses a 6502C . . . . . No doubt this will come as news to U.K. Apple 'Master' distributor Micronon-sense, but then as their MD remarked only the other day: "Apple never tell us anything anyway" . . . . . Business can't be too good in Liverpool; one dealer with a talent for self-publicity has taken to magazine editing in his increasingly spare time . . . . . Can there really be a shortage of sand in California? Enquiring into the (now serious) silicon shortage, one chip manufacturer told me it was due to "Shortage of raw materials" . . . . . HB Computers are normally a smart outfit so what on earth are they doing using the stentorian tones of Colin Stanley to model the voice in their wondrous new speech synthesiser? . . . . . Mrs. Dave Tebbutt writes to tell me that until recently Desperate Dave was also known as *'Tiddles'* . . . . . My friend Gavin Sanders, who is deeply into Buddhism, tells me that the PET is a great improvement on the prayer wheel. Apparently it is capable of 278,520 Hari Krishnas an hour (using tokens, of course) . . . . . Talking of Tiddles, the disco dancing dealer succeeded in annoying most of West London with his 'Tarts & Vicars' party, which ended in uproar. Tiddles was last seen assisting the constabulary with their enquiries, clad in dog collar and fishnet stockings . . . . . Un-abashed by the great computer-dating disaster, Mike Avery has moved on to Artificial Intelligence. Leading researchers are appalled. "He could set us back ten years" says one. Avery's PET is currently engaged in a duel with the *Readers Digest* mailing computer . . . . . One prominent IPUG figure is rather regretting registering his dog in the name of his PET. The Inland Revenue are investigating Mr. C. PET for non-payment of income tax . . . . . My Santa Clara spy reports that Scott Paterson is fiddling with a 96K PET. How is it done? Multiplexing of course . . . . . Thanks to K.S., R.P., R.B., N.G., J.A., K.H., M.H., P.W., G.H., Y.R., G.K. and all the other rat finks who sent me stories. Keep them coming!

NEXT ISSUE

8050 Disk: How Good?
PET Basic Programming style
The Plain Man's Guide to Business Software
PET Show: Full Report

TOMMY'S TIPS!

I often get asked a question about the 'PRINT USING' function that some versions of Basic have, but unfortunately PET does not.

PRINT USING is useful in a number of ways, especially for formatting money amounts.

The question I usually get goes like this:

"Is there a simple way of obtaining leading and trailing zeroes, a floating minus sign, and lined-up decimal points when listing columns of money?"

The answer is "yes" and here's a sub-routine which will do it. It doesn't use much memory, and the subroutine proper starts at Line 60000. Lines 10 and 20 are only there to give an example of how it works, and Line 59990 simply stops the program falling through into the subroutine at its end.

All money amounts to be formatted must be transferred to variable X before using GOSUB 60000, and the TAB statement number in Line 20 should be the column where you want the *last* money digit to be printed.

Thus, if Variable A was equal to 10.2, then somewhere in your program you'd have a line (let's say Line 200) which said:

```
200 X=A:GOSUB60000:PRINTTAB
    (20-(LEN(X$)));X$
```

Your money listings will then be formatted, and beautifully neat! The whole subroutine looks like this:

```
   10 INPUTX:GOSUB60000
   20 PRINTTAB(30-LEN(X$));X$
59990 END
60000 X=INT(X*100+.5)/100
60010 X$=STR$(X):X$=RIGHT$
      (X$,LEN(X$)-1)
60020 IFX<1THENX$="00"+X$:GOTO
      60040
60030 IFLEN(X$)<3THENX$=X$+".00"
      :GOTO60070
60040 IFMID$(X$,LEN(X$)-2,1)="."
      GOTO60070
60050 IFMID$(X$,LEN(X$)-1,1)="."
      THENX$=X$+"0":GOTO60070
60060 X$=X$+".00"
60070 IFX<>ABS(X)THENX$="-"+
      X$:RETURN
60080 X$="  "+X$:RETURN
```

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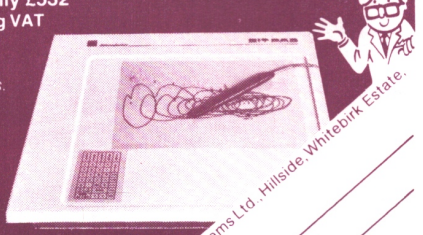

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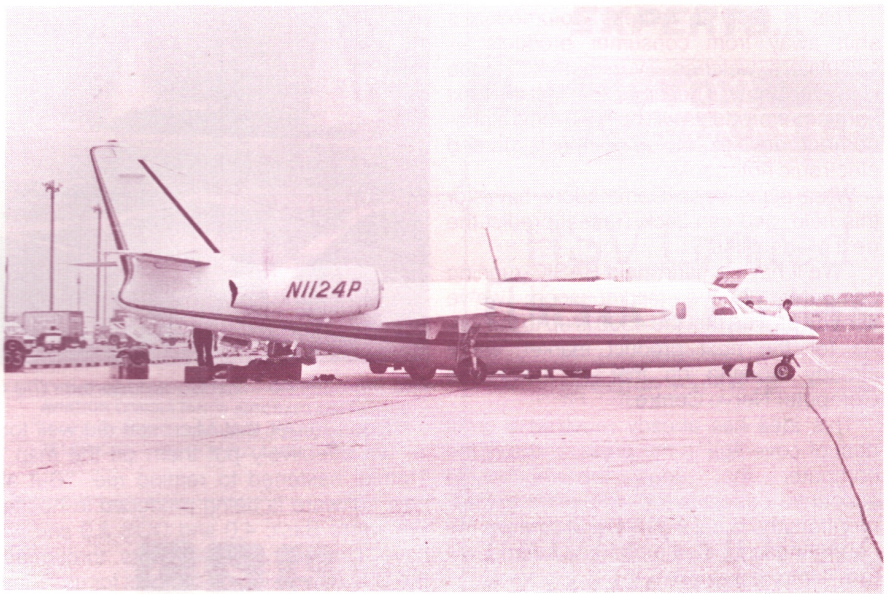
THE COMPANY THAT JACK BUILT

Richard Pawson, PRINTOUT's editor, recently achieved something that few journalists have done — an exclusive interview with Jack Tramiel, the man that built Commodore. Flying back from the Hanover Trade Fair with Tramiel, he put and got answers to many questions that have never before been answered.



The Commodore Jet

Commodore's recent massive growth is usually attributed to the PET, a superb product, ahead of its time in both price and specification. Ultimately the reason, and indeed the reason for Commodore's very existence, is much simpler — Commodore is essentially the work of one man.

Jack Tramiel, the enigmatic President of Commodore International is a small, rotund man with a friendly manner and a forceful personality. He's liked by all who work for him, but held in a healthy respect. And with good reason: he allows his executives one mistake only — the second time he fires them without further discussion.

Jack Tramiel reads PRINTOUT and apparently enjoys our light-hearted predictions for the future of his company. I asked him how it all started.

"After the war, I did service with the U.S. Army, finally managing the repair of all office machinery for the New York area. On leaving I stayed with the business I knew, and secured a hefty $1m contract for the typewriter repair firm I'd joined. However, they didn't reward me well enough for the work I'd done, so I decided that setting up my own company was the only solution."

The business was small initially, but the first main break came when he was asked to supply a large quantity of new typewriters, and later mechanical adding machines, to a major retail outlet in Canada.

Mechanical calculators were to be short lived — "I could see that the future lay in electronics, and started to distribute the new electronic calculators — then about the size of a PET — for Casio". Casio were later to become Commodore's fiercest competitors.

Jack Tramiel finds it difficult to explain his intuition for forthcoming changes in the market.

"I read a lot, and keep my eyes open all the time", he says, "but I don't pretend to understand the technical side of electronics."

A classic example is the way in which he foresaw the move towards integrated circuits — "I realised that California was going to be the place to be in three years time, but I couldn't afford to buy premises there." With typical aplomb he bought a house there instead — to keep up with the action.

Commodore was really a marketing organisation at that stage, buying components from the electronic giants, then assembling calculators and selling them to major retail chains. He was never happy having to rely on outside suppliers for components — late deliveries caused Commodore to miss the seasonal peaks in the calculator market.

This came to a climax when they missed the Christmas market one year and Tramiel cancelled his orders. No less than *twenty-two* of his suppliers sued him simultaneously — and not one of them won their case. "After that they started to co-operate more, but I'd learned a lesson. Vertical integration was the answer — make everything you need, from silicon chips to casings."

The American calculator market crashed in 1975, turning Commodore's $1.18m net profit in 1973 into a thumping $3.85m loss for 1975. "That was when I made the decision to concentrate on Europe." It says a great deal about the man's self-confidence that he managed to raise the money to buy MOS Technology, an integrated circuit manufacturer, at a time like that.

And that was how the PET started. "With MOS, came this guy Chuck Peddle, who wanted to work for me directly. He said he could design a personal computer around the MOS 6502 microprocessor — but hadn't been given the resources to do so."

Tramiel gave him the go-ahead and a very strict deadline.

Peddle produced the goods in time for the 1977 January CES exhibition — but only by working through the night beforehand. "We still didn't know if there was a market for this product, so we asked customers to send cash in advance with their orders." The response was staggering; Commodore took $2m in less than two months.

This move, along with late deliveries, made the company the target of much criticism. Were they considering peripherals at this stage? "We realised that a computer would need peripherals even then, but resources were limited. If we hadn't taken the approach we did, the PET might never have existed at all."

Much of Commodore's approach to problems, it seems, stems from Jack's personal philosophy. "Every morning when I look at myself in the mirror, I think — what are the 10 most important things I have to do today? Taking them in order doesn't make me popular — but it works."

Commodore has changed its colour several times in the last twenty years: from mechanical adding machines, to electronic calculators, to personal computers. Does Jack Tramiel foresee another major change in the offing? "We'll increasingly become a major component supplier — of integrated circuits."

The most devastating news came when I asked him where these chips were to be produced. "In Western Europe" came the answer, though he declined to state whether the U.K. was a possible location.

Does Commodore have any new microprocessors on the drawing board, and will the 6809 replace the 6502 in the SuperPETs? "We won't use anyone else's microprocessor at the heart of our

products," says Tramiel. "We might use one to expand the 6502's capabilities, for example as an input/output chip. The 6502 has a lot of mileage in it yet. However, we may introduce a CMOS capability sometime."

The new 4500 4-bit microprocessor, with on board ROM and RAM, gets him very excited. "It's going to revolutionise the electronic consumer products industry — we'll put it into everything from calculators to programmable vacuum cleaners. Now that the market is changing so fast, we need a device that can be adapted to any task — not a load of specialist chips that may become obsolete."

This is likely to redress Commodore's shift away from consumer products — calculators, watches, TV games etc. At the Hanover Show, it became clear that the next consumer products will be hand-held alpha-numeric devices, including translators and electronic notebooks.

What plans does Commodore have for this field, and can Jack Tramiel predict the next product line?

"We'll have a hand-held BASIC-running computer on the market soon; we've already proved that the 4500 is up to the job. As for the next product market, we're already working on that — the Home Computer Nerve Centre."

This idea has already received a great deal of coverage in the press — the home computer that does the household accounts, educates the kids, plays games, monitors the burglar alarm, and controls the central heating. Commodore, it seems, will turn it into reality.

I asked him where all the software was being produced; it being well-known that Commodore did exceptionally well from the deal with Microsoft for the original Basic.

Inside Commodore's US Headquarters

The futuristic home of Commodore in the USA

"Don't forget that Microsoft did well too — we effectively put them on the map," Tramiel hastened to remind me. "But all new software is being produced in-house. We wrote Basic 4.0 and DOS 2.0 and we have University departments throughout the U.S.A. working on projects for us."

The home computer project, however, does not mean that Commodore is simply going down-market — "We'll move both ways from the PET. The collapsing mini-computer industry is leaving a large market open at the top end of the micro business. The 3 megabyte twin 8" floppy disks and mini-Winchester drives that we have under development will help to move the PET up-market. Meanwhile, the low-cost Matsushita drives will bring the price of a simple floppy right down."

Talking to Jack Tramiel, it's difficult to see anything but clear skies ahead. He's quite a philosopher, and has strong ideas on business ethics — "I'm never the first to cross someone else in business, but if some guy lies to me, I can play very dirty in retaliation."

Does he have any regrets about the way in which Commodore developed? "Not really," he says, then thinking for a bit, "I suppose that I would rather the company wasn't public. There's too much red tape and so many restrictions, but then I wouldn't have had the money to put Commodore where it is today."

What are his goals; is there a point where he'll stop, having achieved his original aims?

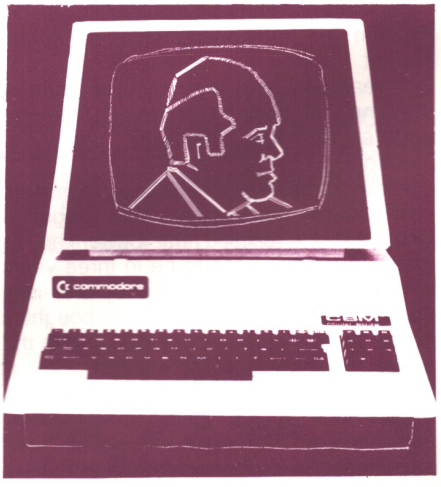
"I want to be President of a billion dollar company, but if I achieve that I suppose the next goal will be five billion. As for getting out, I'm already doing so. I have many senior executives to run the company for me. My only strength is looking to the future, trying to identify the next market trend, the next product and so on."

When we get to London, Jack will indulge himself in his favourite pastime — gambling at the Playboy Club. But that's strictly for pleasure — "I don't gamble with my business. I take risks, certainly, but I make sure I know what the rewards will be in advance."

To most businessmen, Hanover is just the largest industrial fair in the world; to Jack Tramiel it means far more. As we fly out of the city in his luxurious 6-seater jet, he's remembering his first arrival at Hanover in cattle trucks during the war. We fly over the autobahns he was forced to build in the labour camps as a Polish prisoner. "We only rent our time on this earth," he reflects. "When I leave, I want to have achieved something."

It could be hard to get a better monument to one man's vision and drive than a company like Commodore and a product like PET.

the man behind Commodore!



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MORE DEALERS ON PAGE 32...

Personal Electronic Transactions

by Gregory Yob

Before You Send Your PET Away . . .

When you are faced with a balky PET, there's a sneaky trick that will often restore your beloved machine to normal service. The IC sockets used by Commodore are not premium grade, and this leads to two problems as time passes. First, the changes in temperature will make some ICs tend to "walk" up out of their sockets. Second, sometimes the contacts will corrode and become flakey. (Electrically, that is.)

The cure to this is: Turn off your PET, and open the cover. Using your thumb, gently and firmly press down on every socketed IC on the main board. Several IC's will usually slide down a bit into their sockets. Close up your PET, and turn it on. In many cases, your problems will have gone away!

PET Plotting Package

If you are one of the lucky few with an incremental plotter, West Coast Consultants, 1775 Lincoln Blvd, Tracy, CA 95376, has a plotting package, CURVE, for about $75.00. (This requires a PET with 24 or 32K in most cases). The program is initially set up for the Houston Instrument's HIPLOT plotter. I haven't been able to try this package out, but the samples I saw looked reasonably good.

Have You Noticed?

The last local PET club meeting I attended had about 100 people present — some 95 men and maybe 5 women. Of the women, only two or three seemed really interested — the others were along as companions to their men.

This is a common situation in personal computing — and it makes me wonder if personal computing is really a male-oriented hobby? In a more constructive vein, how do we get more women involved?

I am very interested in any responses — especially from any women who read this column, or men who have successfully introduced computers to women (or vice versa!)

On Tokens And Such

When a line of BASIC is entered on your PET, the characters of the keywords (like PRINT, INPUT, GOSUB, etc.) are replaced with one byte tokens. Though this does save some space (we will look into this later), the main reason for tokenizing comes when the BASIC program is RUN. Each BASIC keyword corresponds to a subroutine in the PET's ROM. When a line of BASIC is executed, the presence of a token informs the PET of where to go next. If tokens weren't there, the PET would be forced to look at the characters in the current line and check for keywords **each** time the line is executed. This is complicated and slow.

If you have an "old" PET, the tokenizing of the BASIC line leads to some odd things. (The "new" PETs have been changed to remove this problem — by having **two** tokens, GO and TO. You might want to try this out anyways.) It seems that one BASIC keyword, GOTO, is permitted to be GO TO — that is, a blank is part of the keyword in one of its variations. Since BASIC ignores blanks, and TO is a separate valid keyword, an unusual solution was used. (I have less complimentary adjectives which don't belong in these fine pages.) Here are some examples:

```
10 LISTS IN THE LAST EPICUREAN BANQUET
LIST

10 LISTSIN THE LASTEPICUREAN BANQUET
```

The PET didn't exactly copy what you entered. Where keywords are found, blanks are removed. S IN is seen as SIN, and ST EP becomes STEP. Sometimes this is a hazard in programs, for example:

```
ST AND R2   becomes   S TAN D R2
F OR 6      becomes   FOR 6
```

The "cure" for the GOTO vs GO TO problem was to remove all blanks, tokenize, and then replace the blanks left between the tokens. In most practical cases, simple rearrangements or parentheses will remove any mysteries of this kind.

If you have a "new" PET, try this out and let me know what happens.

Space Savings of Tokens

Back in the early days of PET, BASIC programs from other machines were entered. Often, a 12K program could be fitted into the PET — due to the tokenizing of the keywords. An interesting question is to find out how much space is saved with the tokens for typical programs.

I modified the "self-list" program (See Sep 79 Column) to look for the tokens in a BASIC program and add up the space saved by the tokens. To use this program, LOAD the program you want to measure and then append the program below. (If you have a Programmer's Toolkit! If not, LOAD your target program first and then enter this one.)

```
63000 REM TOKEN SPACE ANALYSIS
63010 REM MODIFIED FROM SELF-LISTING PGM
63020 REM BY GREGORY YOB
63030 DEF FNF(X)=PEEK(X)+256*PEEK(X+1)
63040 REM LP IS LINK POINTER
63050 REM LN IS LINE NUMBER
63060 LP=1025
63070 REM TP IS START OF TEXT
63080 REM CH IS TEXT CHAR
63090 REM MOVE DATA POINTER TO TOKENS
63100 REM ARRAY
63110 DATA *++*
63120 READA$:IFA$<>"*++*"THEN63120
63130 REM S$ HOLDS TOKENS
63140 DIMS$(75):FORJ=0TO75:READS$(J):
      NEXT
63150 DATA END,FOR,NEXT,DATA,INPUT#,
      INPUT,DIM,READ,LET,GOTO
63160 DATA RUN,IF,RESTORE,GOSUB,RETURN,
      REM,STOP,ON,WAIT
63170 DATA LOAD,SAVE,VERIFY,DEF,POKE,
      PRINT#,PRINT,CONT
63180 DATA LIST,CLR,CMD,SYS,OPEN,CLOSE,
      GET,NEW,TAB(,TO,FN
63190 DATA SPC(,THEN,NOT,STEP,+,-,*,/,↑,
      AND,OR,>,=,<
63200 DATA SGN,INT,ABS,USR,FRE,POS,SQR,
      RND,LOG,EXP,COS,SIN
63210 DATA TAN,ATN,PEEK,LEN,STR$,VAL,
      ASC,CHR$,LEFT$,RIGHT$
63220 DATA MID$,!!OOPS!
63230 REM MAKE SAVINGS ARRAY
63240 DIM S%(75):FORJ=1TO75
63250 S%(J)=LEN(S$(J))-1:NEXT
63260 PRINT"clr TOKEN SAVING ANALYSIS"
63270 PRINT:SV=0
63280 LN=FNF(LP+2):TP=LP+4:LP=FNF(LP)
63290 IF LN=63000 THEN 63410
63300 PRINT LN;TAB(6);
63310 QQ=0
63320 CH=PEEK(TP):IFCH=0THEN63400
63330 TP=TP+1
63340 IF CH=34 THEN QQ=QQ+1AND 1
63350 IF CH >128 THEN 63320
63360 IF QQ THEN 63320
63370 IF CH >203 THEN CH=203
63380 TC=TC+1:SV=SV+S%(CH-128)
63390 PRINT S$(CH-128)" sp ";:GOTO 63320
63400 PRINT:IFLP >0THEN 63280
63410 PL=TP-1025
63420 PRINT"dn dn PROGRAM LENGTH IS :"PL
63430 PRINT"NUMBER OF TOKENS sp sp:"TC
63440 PRINT"BYTES SAVED sp sp sp sp sp sp sp sp
      "SV
63450 PRINT"% SAVING sp sp sp sp sp sp sp sp
      sp sp :"100*SV/PL
```

When this is RUN (from RUN 63000), the screen clears, the title is printed, and then the line numbers of the program being analyzed appear along with the tokens in that line. (It is interesting to watch the tokens patterns . . .)

When the program is finished, the report appears — here is an example:

```
PROGRAM LENGTH IS : 1578
NUMBER OF TOKENS  : 143
BYTES SAVED       : 242
% SAVINGS         : 15.3358682
```

I checked several programs, mostly common games, and got these results:

Name	Length	# Tokens	Saved	% Saved
(self)	1259	106	163	12.95
BIORHYTHM	2001	264	340	16.99
LUNAR LANDER	2644	275	505	19.01
WUMPUS	4594	516	1028	22.38
SQUIGGLE	1578	143	242	15.34
BIGTIME	2025	192	484	23.90

The average savings comes to about 19% — if your program is not filled with PRINT and DATA statements, the savings will be increased. The 7167 bytes of an 8K PET are equivalent to some 8570 bytes of non-tokenized program text.

The September '79 column explains the principles used in TOKEN SPACE ANALYSIS — in this case, the program simply looks for tokens and sums up the space savings for each token.

Tokens For Text

If BASIC programs are made shorter by providing tokens for the keywords, how about using the same trick on normal text? Basic English is made of some 800 words, and some words appear more often than others.

Figure 1 shows a chart of the 100 most common English words. If you want to spend some time with a calculator (or PET), Figure 1 yields these facts: 1) About 50% of the words in ordinary text will be on this list. 2) The average savings of a token is around 3.4 characters. 3) The average text compression will be around 30%.

To see if this is true, I wrote a small (?) program which permits the entry of a text sample, tokenization and untokenization of the text — and a report on how well all this went. The first task is to make a primitive text editor and to do some initialization:

```
10 DIM L%(100),S$(100),T$(100),W$(100)
20 FORJ=1TO100:READW$(J):NEXT
100 PRINT"clr TOKEN TEXT PROGRAM
110 PRINT"-- BY GREGORY YOB
120 PRINT"dn dn MENU:
130 PRINT"dn E - EDITOR
140 PRINT"dn T - TOKENIZE
150 PRINT"dn U - UNTOKENIZE
160 PRINT"dn dn CHOICE:";
170 GETA$:IFA$=""THEN170
180 IF A$="E"THEN GOSUB 1000
190 IF A$="T"THEN GOSUB 4000
200 IF A$="U"THEN GOSUB 5000
210 GOTO 100

1000 PRINT"clr EDITOR
1010 PRINT"dn THIS IS A SIMPLE EDITOR
1020 PRINT"WHICH USES LINE NUMBERS
1030 PRINT"LIKE BASIC DOES.
1040 PRINT"dn LIST WILL SHOW THE TEXT
1050 PRINT"sp sp sp sp sp sp AND WILL
     HALT ON THE 'SPACE'
1060 PRINT"sp sp sp sp sp sp KEY.
1070 PRINT"dn EXIT LEAVES THE EDITOR.
1080 PRINT"dn dn PRESS KEY TO START
1090 GETA$:IFA$=""THEN 1090
1100 PRINT"clr";
1110 INPUT T$
1120 IF T$="LIST" THEN 1300
1130 IF T$="EXIT" THEN RETURN
1140 LN=INT(VAL(T$))
1150 IF LN<1 OR LN>32760 THEN PRINT
     "*IGNORED*":GOTO 1110
1160 GOSUB 8500
1170 IF LEN(T$)<=LEN(STR$(LN))THEN 1260
1180 T$=MID$(T$,LEN(STR$(LN))+1)
1190 REM REPLACE OR ADD TO END
1200 IF LN=L%(L) OR L%(L)=0 THEN S$(L)=
     T$:L%(L)=LN:GOTO 1110
1210 REM INSERTION (SLOW!!)
1220 IF L=101 THEN PRINT"*FULL*":GOTO 1110
1230 FORK=100 TO L+1STEP-1:L%(K)=L%(K-1)
     :S$(K)=S$(K-1):NEXT
1240 L%(L)=LN:S$(L)=T$:GOTO 1110
1250 REM DELETION
1260 IF L%(L)<>LN THEN 1110
1270 FOR K=L TO 99:L%(K)=L%(K+1):S$(K)=
     S$(K+1):NEXT
1280 L%(100)=0:S$(100)="":GOTO 1110
1290 REM LIST
1300 FOR L=1 TO 100
1310 IF L%(L)=0 THEN 1110
1320 GETA$:IFA$<>""THEN 1110
1330 PRINT L%(L)S$(L):NEXT:GOTO 1110

8500 REM SEARCH FOR LINENUMBER
8510 FOR L=1 TO 100
8520 IF LN<= L%(L) THEN RETURN
8530 IF L%(L) = 0 THEN RETURN
8540 NEXT:RETURN

9000 DATA A,ABOUT,AFTER,ALL,AN,AND,ANY,
     ARE,AS,AT,BE,BEEN,BUT,BY,CAN,COULD,
     DO
9010 DATA EVEN,FIRST,FOR,FROM,GREAT,HAD,
     HAS,HAVE,HE,HER,HIM,HIS,I,IF,IN,
     INTO
9020 DATA IS,IT,ITS,LIKE,MADE,MAN,MAY,
     ME,MIGHT,MORE,MOST,MUCH,MUST,MY,
     NEW,NO
9030 DATA NOT,NOW,OF,OLD,ON,ONE,ONLY,OR,
     OTHER,OUR,OUT,OWN,SAID,SHALL,SHE
9040 DATA SHOULD,SO,SOME,SUCH,THAN,THAT,
     THE,THEIR,THEM,THEN,THERE,THESE
9050 DATA THEY,THIS,THOSE,TIME,TO,TWO,
     UP,UPON,US,VERY,WAS,WE,WELL,WERE
9060 DATA WHAT,WHEN,WHICH,WHO,WILL,WITH,
     WOULD,YET,YOU,YOUR
```

So, what does this get us? The arrays in Line 10 are: L%( ) to hold the line numbers in the Editor, S$( ) to hold the untokenized text, T$( ) to hold tokenized text, and W$( ) to hold the 100 most common English words. Line 20 reads the words into W$, and Lines 100 to 210 take care of a simple menu and GOSUBs to the selected action. At present, only "E" will work.

The DATA statements in 9000 hold the words list. Don't worry about the 3-line lines — they **will** fit on the PET, and are expanded here for layout into one column.

The Editor is designed to work like the PET's BASIC editor — you enter a line number and some text. A line number by itself will delete a line. The line numbers are stored in L%, and the text in S$. These are kept in increasing order of line numbers — which means a bit of shuffling when an insertion or deletion is done. If you need a **minimal** Editor, steal this code!

Lines 1000 to 1090 simply explain the Editor — I am too lazy to just show it once — so you will see the instructions every time you select "E." Lines 1110 to 1130 enter a line and check for the two commands LIST and EXIT. Line 1140 grabs the line number and 1150 checks for a legal number. (remember that 32767 is the largest legal integer in the PET.) An illegal line is *IGNORED*.

Subroutine 8500 scans through the line numbers array L% to find where the entered line should go. A zero line number in L% means that all the current lines have been looked at. We end up with these possibilities:

1) L = 101
   The text area is full. (unlikely!)
2) L%(L) = 0
   Add line to end of text.
3) L%(L) = LN
   Change a line or delete it.
4) L%(L)<>LN
   Insert or ignore.

These conditions will be handy later.

Line 1170 is a check for a line number without text — and jumps to the deletion code. Line 1200 checks for replacement or adding to the end of text. Fortunately, the add-to-end is simply replacing the line at L which was previously empty. The line number is replaced (often not needed, but not worth checking for) and the text inserted in S$.

Insertion is slow and painful (cause I'm lazy and want to get on to tokenizing, remember?). Line 1220 checks for the *FULL* condition. Then we "ripple up" all the text with larger line numbers to create a "hole" — done in 1230. Line 1240 does the insertion.

Deletion is similar — with a "ripple down" and the removal of the line # and text at the end.

LIST simply prints the line # and text — with a check for a keyboard entry between each line to allow a SPACE to halt the listing.

This Editor, being simple, won't take text after commas, and is susceptible to the other faults of the PET's INPUT statement.

To tokenize some text, each word is found by looking for blanks. Just as the PET sometimes includes a parenthesis in a token, like SPC(, the space after each word will be included in each token. (Even "I" will save a byte!). When text is unfolded, the added space will be replaced, and the text will be normal again. The codes for the tokens are made by looking at the position of the word in W$ and adding 128. For example, the token for ABOUT is CHR$(130).

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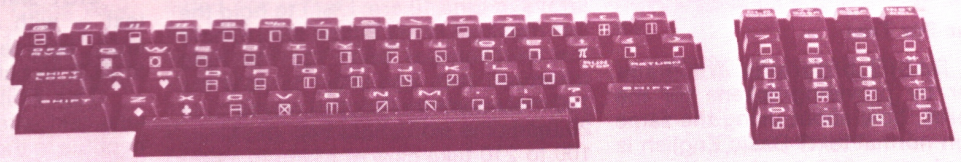

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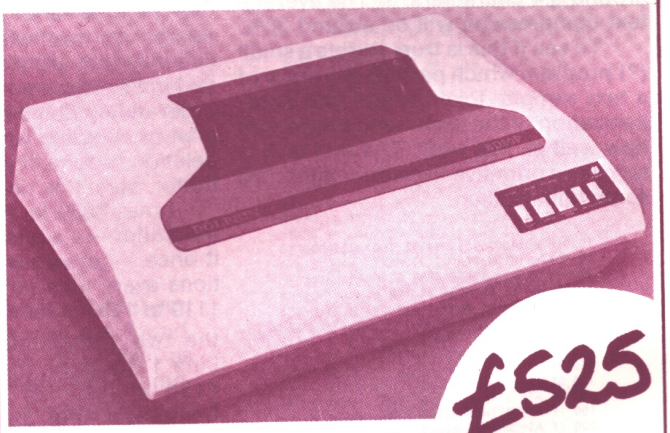

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PET, cont'd . . .

Here is the rest of the program:

```
4000 PRINT"clr TOKENIZE TEXT"
4010 PRINT"dn dn HAVE, PATIENCE, I AM SLOW
      BUT SURE
4020 FOR J=1 TO 100:T$(J)="":NEXT
4030 PRINT"dn dn";
4040 TC=0:CS=0:CC=0
4050 FOR L=1 TO 100
4060 IF L%(L)=0 THEN 4170
4070 S$=S$(L)+" sp ":T$=""
4080 REM SCAN FOR TOKENS
4090 CC=CC+LEN(S$):X$=""
4100 FORJ=1TOLEN(S$):A$=MID$(S$,J,1)
4110 IF A$<>"sp" THEN X$=X$+A$:NEXT
4120 GOSUB 8000
4130 IF P=0 THEN X$=X$+"sp":T$=T$+X$:
      PRINT X$;:GOTO 4150
4135  TC=TC+1:CS=CS+LEN(W$(P))
4140 T=P+128:T$=T$+CHR$(T):PRINT"["
      MID$(STR$(T),2)"]";
4150 X$="": NEXT J
4160 T$(L)=T$:PRINT:NEXT L
4170 PRINT"dn dn FINISHED - PRESS KEY TO
      GO ON
4175 GETA$:IFA$=""THEN 4175
4180 PRINT"clr TOKENIZING REPORT
4190 PRINT"dn dn SOURCE IS"CC" CHARS LONG
4200 PRINT"FOUND"TC" TOKENS AND
4210 PRINT"SAVED "CS" CHARACTERS
4220 PRINT"RESULTS IN A ";
4230 PC=INT(CS/CC*10000)/100
4240 PRINT PC" sp % SAVINGS
4250 PRINT"dn dn PRESS KEY, ETC"
4260 GETA$:IFA$=""THEN 4260
4270 RETURN
5000 REM UNFOLD TEXT
5010 PRINT"clr UNTOKENIZED TEXT:
5020 PRINT"dn dn
5030 FOR L=1 TO 100
5040 IF L%(L)=0 THEN 5100
5050 T$=T$(L): FORJ=1 TO LEN(T$)
5060 A$=MID$(T$,J,1):A=ASC(A$)
5070 IF A<128 THEN PRINT A$;:GOTO 5090
5080 PRINT W$(A-128)"sp";
5090 NEXT:PRINT:NEXT
5100 PRINT"dn dn DONE - PRESS KEY, ETC
5110 GETA$:IFA$=""THEN 5110
5120 RETURN

8000 REM GIVEN X$, BINARY SEARCH W$
8010 TP=100: LP=1
8020 IF LP>TP THEN P=0: RETURN
8030 P=INT((TP+LP)/2)
8040 IF X$=W$(P) THEN RETURN
8050 IF X$>W$(P) THEN LP=P+1
8060 IF X$<W$(P) THEN TP=P-1
8070 GOTO 8020
```

To tokenize the text, the first step is to remove any junk in T$ from a previous pass — in Line 4020. Then some counters are set up in Line 4040. TC is the Tokens Count, CS is Characters Saved, and CC is Characters Counted. Lines 4050 and 4060 set up the L loop to look at each line of text. S$ is made the line of text with a space at the end — this permits words at the end of a line to be tokenized. In Line 4100 to 4110 we snatch characters and stuff them into X$ until a space is found. Subroutine 8000 searches for a token word match. A non-match adds X$ to the compressed string T$, in Line 4130, and a match builds a token in Line 4140. Line 4135 is a later addition which keeps the counters updated. Note that the compressed text is printed to the screen, with token numbers in brackets.

When all this is done, the string T$ is put into the T$( ) array — and then a brief report of the tokenizing effort is printed.

Decompressing the text is simpler — since tokens aren't normally printed characters, they are easily detected and the tokens looked up for display. Note that Line 5080 has to add the "sp" that is implied in every token.

Subroutine 8000 is an example of a Binary Search. Rather than looking through all 100 tokens in sequence, with an average search through 30 or more items (remember some are more common than others.), the tokens are arranged in alphabetical order. The search works like this:

1) Set the top pointer to the top of the list.

2) Set the bottom pointer to the bottom. (Line 8010)

3) If top pointer is larger than the bottom pointer, the search failed. (Line 8020) Note: If P is left alone, it will indicate where the item would fit in for an insertion.

4) Select a test value midway between the top and bottom pointers. (Line 8030)

5) Quit if there is a match. (Line 8050)

6) If the List item is too small, move the bottompointer up to one past the test pointer (Line 8060). This halves the searching area.

7) And vice versa. (Line 8060)

8) Repeat by going to Step 3. (Line 8070)

If you can sort the items in a list, and the list is longer than about 20 items, a Binary Search is a faster method — especially for long lists. Save this code away for use in other programs. (You wouldn't **believe** how long it takes to debug these things!)

I tried a few text samples, and got these results:

First two Paragraphs of this Column:
25.15% savings

First Paragraph, ARTWEEK, 13 Oct 79
17.43% savings

Creative Computing's Ad for Wumpus
21.41% savings

I don't have space for a sample RUN of this program — try it out on your own. A more elaborate version would look at the text and compile a tokens table based on the frequency of words in the text itself.

A similar approach is to tokenize letter combinations (diagrams, trigrams, etc.), or to take note that some letters follow others with differing frequencies, and storing the transitions instead of the letters. A very useful article for the probability tables used for this appeared in: IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. PAMI-1, Number 2, April '79. See "n-Gram Statistics for Natural Language Understanding and Text Processing," Page 164.

As a last thought — if two-byte tokens were allowed, some 65,536 words could be compressed into two-byte values. A typical word has 4 characters plus the space — or about a 60% compression is possible. One might also consider 12 bit tokens, for 4096 words, and two tokens in 3 bytes. (And **Don't** mention Radix-41!) □

THE COMMONEST ENGLISH WORDS

Below are listed the hundred most frequently used words in English. The figures give occurrences in 242,432 words of English text taken from fifteen English authors and many newspapers. Compiled by Frank R. Fraprie.

THE	15568	OR	1101	WHEN	603	ONLY	309
OF	9767	HER	1093	WHAT	570	ANY	302
AND	7638	HAD	1062	YOUR	533	THEN	298
TO	5739	AT	1053	MORE	523	ABOUT	294
A	5074	FROM	1039	WOULD	516	THOSE	288
IN	4312	THIS	1021	THEM	498	CAN	285
THAT	3017	MY	963	SOME	478	MADE	284
IS	2509	THEY	959	THAN	445	WELL	283
I	2292	ALL	881	MAY	441	OLD	282
IT	2255	THEIR	824	UPON	430	MUST	280
FOR	1869	AN	789	ITS	425	US	279
AS	1853	SHE	775	OUT	387	SAID	276
WITH	1849	HAS	753	INTO	387	TIME	273
WAS	1761	WERE	752	OUR	386	EVEN	272
HIS	1732	ME	745	THESE	385	NEW	265
HE	1727	BEEN	720	MAN	383	COULD	264
BE	1535	HIM	708	UP	369	VERY	259
NOT	1496	ONE	700	DO	360	MUCH	252
BY	1392	SO	696	LIKE	354	OWN	251
BUT	1379	IF	684	SHALL	351	MOST	251
HAVE	1344	WILL	680	GREAT	340	MIGHT	250
YOU	1336	THERE	668	NOW	331	FIRST	249
WHICH	1291	WHO	664	SUCH	328	AFTER	247
ARE	1222	NO	658	SHOULD	327	YET	247
ON	1155	WE	638	OTHER	320	TWO	244

Figure 1- Common Words Table

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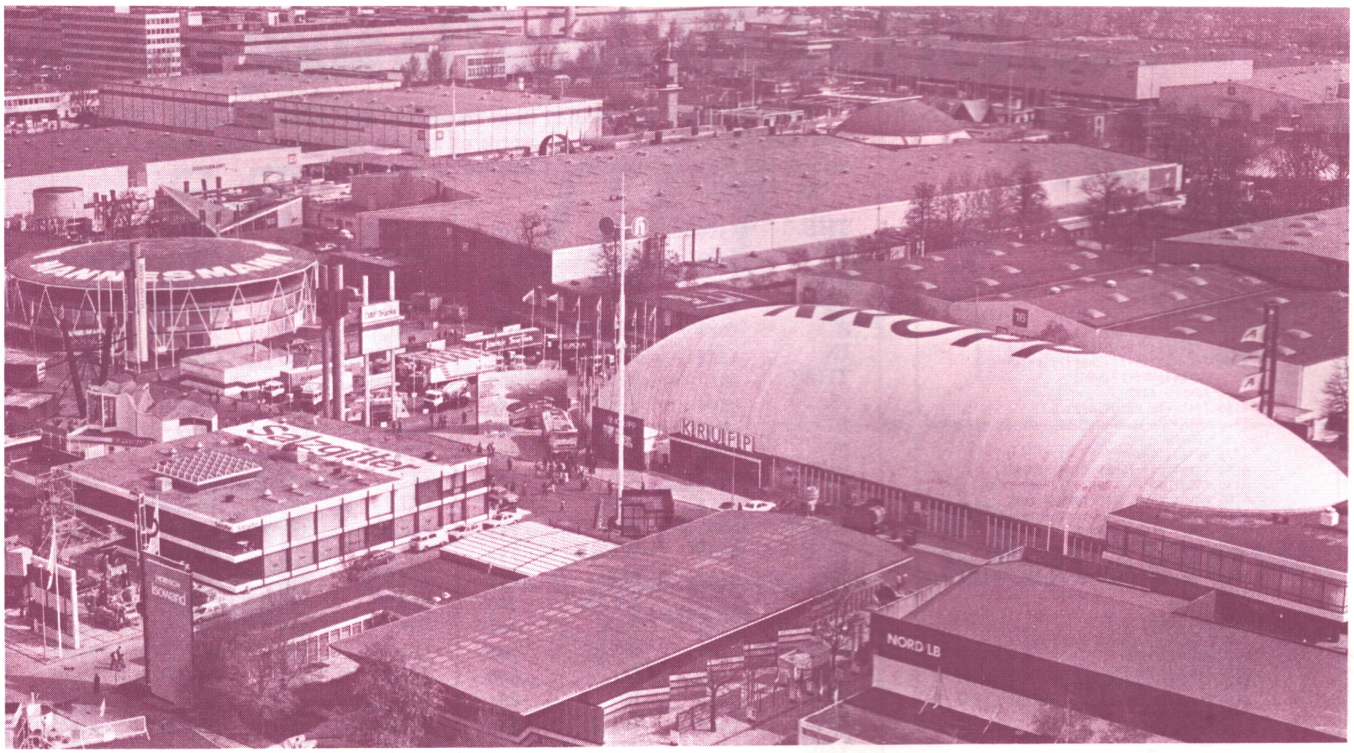


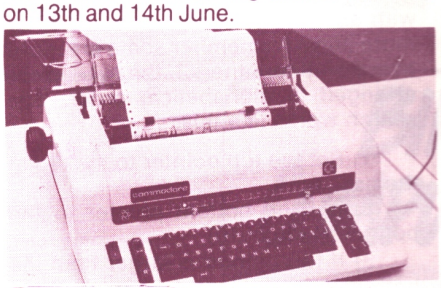
HANOVER FAIR REPORT

To anyone who has never been to the Hanover Industrial Fair, it is almost impossible to describe the sheer scale of it. There are 24 separate halls covering a square mile of ground, the smallest of which is twice the size of Olympia, the largest having a whole village on the roof! The products displayed range from computers to excavators, and from digital watches to complete Swiss Chalets. It is hardly surprising that such companies as ICL, Hewlett Packard and IBM reserve their major European announcements for this show. Commodore are no exception.

Much of what Commodore displayed on their new large stand was predictable, though there were a few surprises in store. What PRINTOUT dubbed the SuperPET, Commodore have now designated the 8000 Series — an 80 column screen PET and a new 1 megabyte disk unit. The 8032 has a 12″ monitor with a split-screen facility; this means that you can put instructions in one place on the screen, undisturbed by future PRINT statements. The new BASIC 4.0 has also cleared up the Garbage Collection problems encountered with current PETs. A full review of the new machine by Jim Butterfield will be found elsewhere in this issue.

The accompanying 8050 disk unit looks identical to the 3040 but is based on two 5″ Micropolis drives — giving a total capacity of 1 megabyte. More tracks are used on the 3040 so disks will not be directly compatible, but Chuck Peddle, resident genius of Commodore's development department, states that all new disk drives will have similar operating systems.

Although announced at Hanover for Commodore Germany, the 8032 and 8050 have not been officially launched in the U.K. PRINTOUT expects that more positive news will be forthcoming at the PET Show on 13th and 14th June.



The converted Olympia daisy-wheel typewriter

On the yes-we-are-developing-it-but-no - we - don't - know - when - it - will - be - available-or-how-much-it-will-cost table, Commodore had two new disk units and, of course, the colour PET. The first was a twin 8″ Shugart drive yielding up to 3 Mbyte online. Also shown were the new ultra-cheap Matsushita drives which will be sold as a single drive capable of expansion to two later. These may be fitted within the PET housing at a later date. They are slightly slower than those used in the 3040, offer 160K bytes each, and are expected to be somewhat cheaper. No official statement has been made on these products in the U.K.

Further developments are likely in the printer field, Commodore Germany having shown a converted Olympia daisywheel typewriter at the Hanover Fair. Interfaced to PET, it prints in a stylish typeface at 15cps. If Kit Spencer can be persuaded to introduce this in the U.K., the price tag could be well below £1,000.

The 8000 Series SuperPET attracted a lot of attention

Chuck Pedal, father of the PET, at Hanover

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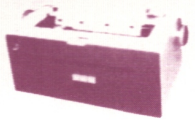

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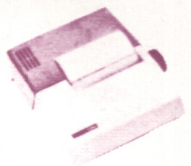

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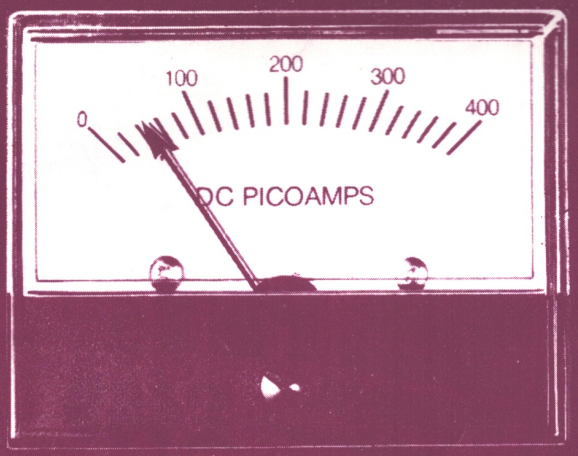
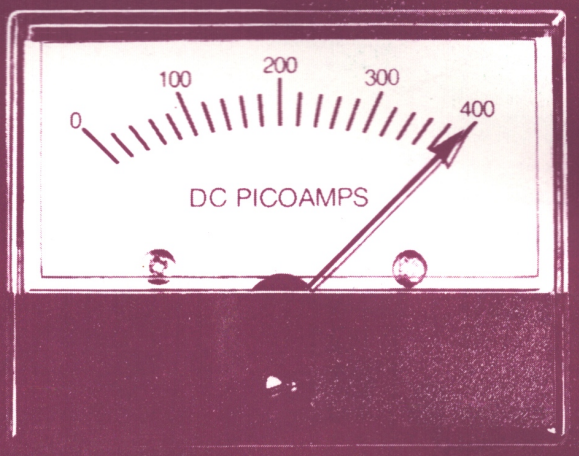
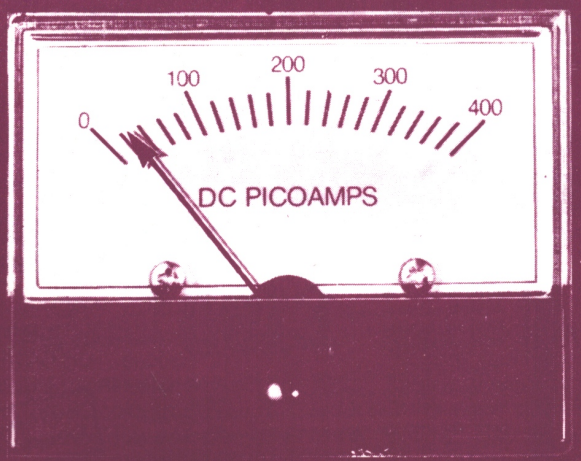


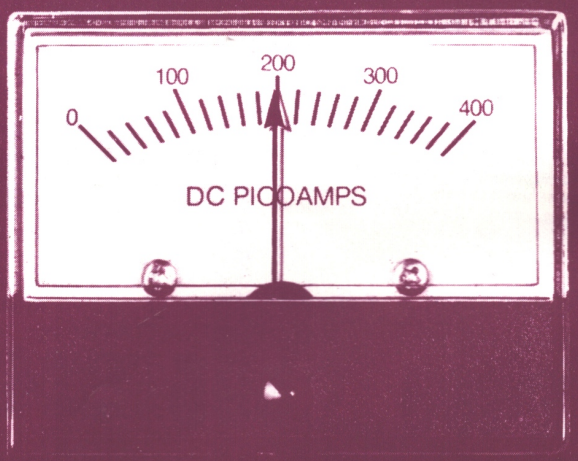
COOLANT



FUEL



TEMPERATURE



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